THE IRON TRADE REVIEW

Single Copies 15 Cents CLEVELAND, FEBRUARY 14, 1918 Four Dollars a Year

FEB 15 1918.

Iron Men of America!

Answer the Call for the Conservation of Labor and Materials

ALL the dollars in the world cannot buy Victory. Dollars can only work for Victory insofar as they are converted into labor and materials. A dollar hoarded is a slacker—a dollar wasted is a traitor—a dollar saved is a PATRIOT. A hoarded dollar represents idle power, a wasted dollar represents wasted power, but a dollar invested with the United States Government, instead of being spent for non-essentials, represents power, labor and materials SAVED for the use of our armed forces in the great fight for Victory.

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WASHINGTON, D. C.

This space donated by Columbia Steel & Shafting Co., of Pittsburgh, Pennsylvania.

Advertisers' Index, pages 156-157. Contents, page 71. "Where-to Buy," page 80.
Engineering Directory, pages 122-123. Classified Advertisements, pages 132-155.

Shall we burn the Toluol, or shall we shoot it?

Shall we throw away the ammonia, or shall we make it produce wheat?

Shall we pollute the air with tar and gas, or shall we make them produce war materials?

Shall we waste our coal supply, or shall we conserve it?

A KOPPERS By-Product coke plant will produce the maximum yield of coke and will recover from the coal the tar, ammonia, gas and toluol that is wasted in bee hive coking and in burning raw coal.

H. KOPPERS COMPANY

PITTSBURGH, PA.

Builders of By-Product Coke Plants

Say you saw it in THE IRON TRADE REVIEW

THE IRON TRADE REVIEW

Vol. LXII Cleveland, February 14, 1918 *No. 7*

Weather Brings Better Operations

Pittsburgh and Valley Open-Hearth Operations Raised to 84 Per Cent—Blast Furnace Recovery Slow—Great Tonnage of Unshipped Product in Mill Yards is Market Factor—Iron Shortage More Threatening

A FEW days of moderate weather conditions have done more to recoup iron and steel production than any drastic exercise of governmental authority. An appreciable improvement in operations is reported from practically all important districts. In the Pittsburgh and valley zone, this recovery has amounted to from 10 to 25 per cent. Open-hearth operations in that territory last week were at 84 per cent, compared with 59 per cent in the storm period. Blast furnaces are regaining ground more slowly, their output having been 69 per cent against 66 per cent previously. Bessemer plants ran 61 per cent full, and by-product coke works at 90 per cent, compared with 66 per cent the preceding week. Conditions in the Connellsville coke region, where car supply has come back to 70 and 75 per cent, are pronounced to be the best in two months. Flood dangers at Pittsburgh and other river points serve to becloud the otherwise hopeful prospects. High waters already have forced two works to suspend in the Cincinnati district.

That the recurrence of the recent heavy shrinkage of iron and steel output is not to be risked under present conditions of national stress, is shown by the preventative steps being taken at Washington. A proposal is receiving consideration from Director of Railroads McAdoo to exempt raw and finished iron and steel materials from all railroad embargoes in the future. What the recent interruptions of production have meant may be drawn from the steel ingot loss in January, which was at the annual rate of over 7,000,000 tons compared with December, and over 12,000,000 tons against November, according to official tabulations of the American Iron and Steel institute.

Iron Shortage is Growing

Events of the pig iron market show a steady trend toward a condition of serious shortage. The problem of how all requirements of steelmaking iron are to be satisfied is likely to become acute not long after the works get down to normal operations again. The recent sharp slump in production has aggravated the situation and many producers in selling now are obliged to take into account the first half tonnage they must carry over into the last six months. Some furnace interests already are prorating tonnage to regular customers for the last half in anticipation of heavy government demands. These allocations are growing weekly as consumers filling war contracts find it more difficult to buy for themselves. A new lot just distributed calls for 4500 tons for the American Shipbuilding Co. Various producers are insisting that the situation has got beyond their control and that it will be incumbent upon the government to exercise a more vigorous regulation of buying and distribution. Important consumers are facing difficulty because of stacks being kept exclusively on basic, which had been supplying foundry and malleable grades in the past.

Steel Buying is Blocked

Buying of finished materials has been pushed aside recently by the exigencies of plant operations. With several hundred thousand tons of finished product piled in yards or on cars awaiting shipment in the Pittsburgh and valley districts alone, it is clear why new sales have been negligible. At Youngstown, 42,900 tons of steel have been piled, while there are 65,000 tons at one leading plant at Pittsburgh. Mill stocks of tin plate have been forced up to over 3,000,000 boxes. An echo of the better outlook for the automobile industry is the lifting by the mills of suspension of unspecified tonnage under contracts expiring Jan. 1. Orders on mill books originally entered for commercial purposes more and more are being converted into war uses. Government tonnage is being maintained heavily.

Chicago mills have a new order for 20,000 tons of ship steel for the Pacific coast. The Emergency Fleet corporation, it is estimated, will need 45,000 tons of steel chain for its vessel program as at present laid out. Steel is being bought for 4500 army truck trailers just distributed.

The Iron Trade Review

EDITORIAL

Definite Price Clause Needed

WHEN President Wilson reaffirmed iron and and steel prices on Dec. 28, for the period of three months ending March 31, he introduced a new factor into the field of government regulation which since has assumed a position of first importance. This expression of the President related to deliveries on new contracts which would antedate March 31. It was provided that in all such contracts no price should be specified unless it was coupled with the clause making it subject to revision by any authorized government agency to the basis of the maximum fixed price then in effect.

This ruling has given rise to various complications and probably no phase of the government market regulation has brought about such deep and careful study on the part of producers. Many buyers following their usual custom have insisted on being allowed to make contracts for deliveries subsequent to the first quarter of this year. It has been a vital question for both buyers and sellers what phraseology should be employed in the revision clause which would meet all the varied contingencies and not reduce the contract to a mere piece of paper with no more legal force or value.

The iron ore producers especially have been in a dilemma since the nature of their business requires that they shall make their sales for a 12-month period. An interpretation of the President's declaration to be made through the war industries board and the American Iron and Steel institute, as recently noted, is expected to clear the situation materially. The steel trade has been less acutely affected by the uncertainties of the compulsory revision because of the notorious record of the producers on the subject of the nonenforcement of positive contracts in the past.

Pig iron consumers and producers who have been active in buying and selling for shipment throughout the present year have been most concerned by the contract problem. Seeking the same end, the clauses covering price revision adopted by various producers have been framed apparently with considerable divergence of viewpoint. Southern producers have provided for themselves the privilege of cancellation should the future price be unsatisfactory to them. One large producer in the Chicago district has adopted the following phraseology:

"The prices to be paid by the purchaser for any of the materials named herein, which are shipped under this contract after March 31, 1918, shall be the price fixed for that time by proper U. S. government agency by agreement or otherwise, as the public or market price for such material, instead of the price herein named."

An important furnace interest in the central west has met the situation with the following insertion:

"The price herein named, involving material shipped hereunder after March 31, 1918, shall be changed to the maximum price, at the time of shipment permitted by law or proper United States government order. If no price is fixed by law or government order for the period in which the shipment on this contract is made, the price for such shipment shall be $33 per ton, f.o.b. cars furnace."

An advantageous feature of this clause is that it provides a definite price basis for the undelivered portion of the contract should government regulation cease. This is especially important to consumers who must base their own sales contracts such as castings upon a definite pig iron price.

The dissimilar attempts which are being made to meet the problem over future deliveries strongly suggest the need of a definitely-phrased clause carrying official weight which will subscribe to the President's wishes and meet all contingencies of the ordinary iron and steel transaction. It is to be hoped that the American Iron and Steel institute in interpreting the President's declaration in behalf of the iron ore trade, will make an announcement which will be equally applicable to all branches of the industry.

Duty of Service is Paramount

AMERICAN industry, and that means the nation in the present war situation, is utterly dependent on the railroads. This has been shown in the past few weeks when snows have blocked transportation and industry has been partially paralyzed and greatly reduced in output. Never before has a time existed when so much depends on railroads or, in turn, have the railroads depended so much on their officers and employes. The quantity of material that can be produced is exactly parallel with the efficiency of transportation. This begins with coal and other raw materials and ends with the carriage of the finished product to seaboard or other destination. When the railroads failed through stress of storm, industry shut down. Continuance of drastic curtailment of production will cause economic disaster and as a result may affect military effectiveness to a large degree.

With weather conditions better, allowing rail-

The Iron Trade Review
EDITORIAL

roads to resume something like normal operation, the task will be to increase efficiency. This can be done by cutting out useless transportation and by localizing consumption of materials as far as possible, in an effort to lift such of the burden from the carriers as can be done without harm. It is essential that the most be made of equipment now available. Just how much can be done in this line remains to be seen, but plans now under way doubtless will accomplish much.

The situation makes of the railroad employe a unit as important as a soldier at the front. If he increases his efficiency, the soldier will be better served and able to do more for the good of the nation. If the railroad employe fails, the soldier will be handicapped. It is up to every railroad worker to do his utmost. Now that men are scarce, the old fear that added achievement on his part would reduce the number of employes no longer holds.

Maximum Loads Are Imperative

THE serious handicap which the iron and steel industry has been compelled to suffer because of the inadequacy of the transportation system has not been entirely devoid of beneficial results. For one thing, it has taught the necessity of conserving car space. In the past shipments were loaded without sufficient regard to this important matter. Today it is different. Manufacturers, realizing the shortage of cars, and the difficulty of getting them, are making the best use possible of those placed at their disposal. They are being loaded to the maximum.

It used to be a common thing for cars to carry consignments weighing less or but little more than "marked capacity". Now they exceed that point and loads weighing 10 per cent over "marked capacity" are not uncommon in the case of products which readily lend themselves to this practice. The tonnage represented by this margin beyond the ordinary loading, in the aggregate, mounts into a large total. It means that much more car space for other shipping and transportation, both on land and on sea, which is the biggest problem today in connection with the successful prosecution of the war.

The custom is one that should be made permanent. It shares prominently in a scheme of economics that helps both the carriers and the shippers.

Regulation in a Business-Like Way

WHEN it became apparent that regulation of the importation of ferroalloys and kindred ores and metals had become a necessity, those commercially interested in this traffic were quick to avail themselves of an opportunity extended to them. At a meeting in New York, Dec. 16, called at the request of Frederick P. Peterson, director of the bureau of imports of the war trade board, they unanimously designated the American Iron and Steel institute to act as the instrumentality through which such regulation should be applied. The work accordingly was given into the hands of a subcommittee on ferroalloys consisting of leading importers, dealers and consumers.

The license system which this committee has formulated is described in detail in this issue of THE IRON TRADE REVIEW. It was designed to meet the desire for effective import regulation and in this respect it has been approved by the war trade board. The feature upon which all importers, dealers and consumers have cause for deep gratification, however, is that the system also was designed to fit the trade. Pains have been taken to provide machinery for the expeditious handling of imports under the regulations and to guard against delays and mistakes. Already competent men have been established by the institute at New York and San Francisco, clothed with the necessary custom house power of attorney for the endorsement of bills of lading.

The fortunate thing, however, is that the system is to be enforced by men who are thoroughly conversant with ferromanganese and the other metals and ores involved. They know the customs of the trade, the requirements of industry, the sources of supply, the transportation situation and all the surrounding conditions. While the method thus evolved is not a precedent, it is an example of a variety of government regulation which still is somewhat unusual—that is, regulation by men who know absolutely what they are regulating. The war trade board in effecting control of these articles in this manner has taken a decidedly forward step and one well calculated to co-ordinate national necessities with prevailing methods of doing business. In addition, the delegating of duties of this kind to manufacturers and experienced men has the effect of convincing other business men that the government proposes to do things in a businesslike way which they can understand and approve.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 460

PIG IRON

Bessemer, valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern)	$33 furnace base
2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern)	base plus 50c
2.75 to 3.25 silicon (No. 1X No. 2 soft)	base plus $1.50
Over 3.25 silicon	$34.50, plus $1.00 for each ½ per cent of silicon.
No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide.	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low Phos., Piittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens.)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Wise county furnace	6.00
Pocahontas furnace	6.00
New River foundry	7.00
New River furnace	6.00
Wise county foundry	7.00

FERRO ALLOYS

Ferromanganese, delivered	$250.00
Spiegel, 20 per cent fur.	60.00
Spiegel, contracts, furnace	58.00 to 60.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, Pittsburgh	175.00 to 180.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	170.00 to 175.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straisville, O.

SEMIFINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh	$47.50
Open hearth, Philadelphia	50.50
Open hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forgin, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open hearth, Pittsburgh	$51.00
Open hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chicago	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c
Cotton ties, Pitts., Jan.	$2.18

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	75.00 to 80.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	4.80c to 4.90c
Tie Plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pittsburgh	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in proof coil, Pitts	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open hearth, Chic.	5.715c to 6.215c
No. 10, open hearth, Phila	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
⅛ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi-finished hexagon nuts ⅜ in. and larger	60–10–10 off
Cold pressed semi-finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products February 13, average for January 1918, average for November 1917, and average for February 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices Feb. 13, 1918.	Average prices Jan., 1918	Nov., 1917	Feb., 1917
Bessemer pig iron, Pittsburgh..	$37.25	$37.25	$37.25	$35.95
Basic pig iron, Pittsburgh....	33.95	33.95	33.95	30.95
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	33.95
*No. 2. Foundry pig iron, Chi.	33.00	33.00	33.00	31.25
Lake Superior charcoal, Chicago	37.50	37.50	37.50	34.50
Malleable, Chicago	33.50	33.50	33.50	31.25
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	24.50
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	33.00
Basic, eastern Pa.....	33.00	33.00	33.00	30.50
**No. 2X Virginia, furnace....	33.50	33.50	33.50	29.00
**No. 2X foundry, Philadelphia	34.25	34.25	34.00	32.00
Ferro mang., delivered.....	250.00	250.00	247.00	265.00
Bessemer billets, Pittsburgh....	47.50	47.50	47.50	62.50
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	62.50
Open hearth sheet bars, Pitts..	51.00	51.00	51.00	62.50
Open hearth billets, Pitts.....	47.50	47.50	51.00	62.50
Steel bars, Pittsburgh.....	2.90	2.90	2.90	3.00
Steel bars, Chicago.....	2.90	2.90	2.90	3.15
Iron bars, Philadelphia.....	3.50	3.648	4.335	3.259
Iron bars, Cleveland.....	3.64	3.64	4.00	3.00

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices Feb. 13, 1918.	Average prices Jan., 1918	Nov., 1917	Feb., 1917
Iron bars, Chicago mill.....	3.50	$3.50	$4.10	$3.00
Beams, Chicago.....	3.00	3.00	3.00	3.38
Beams, Pittsburgh	3.00	3.00	3.00	3.25
Beams, Philadelphia	3.185	3.185	3.185	3.509
Tank plates, Pittsburgh	3.25	3.25	3.25	3.75
Tank plates, Chicago	3.25	3.25	3.25	3.94
Tank plates, Philadelphia ...	3.435	3.435	3.435	5.009
Sheets, blk., No. 28, Pitts....	5.00	5.00	5.30	4.56
Sheets, blue anld., No. 10, Pitts	4.25	4.25	4.60	4.37
Sheets, gal., No. 28, Pitts... ..	6.25	6.25	6.50	6.50
Wire nails, Pittsburgh.....	3.50	3.50	3.50	3.00
Connellsville fur. coke.....	6.00	6.00	6.00	8.00
Connellsville fdy. coke.....	7.00	7.00	6.60	6.50
Heavy melting steel, Pitts.....	30.00	30.00	29.60	21.87
Heavy melting steel, eastern Pa.	30.00	29.80	27.50	20.50
Heavy melting steel, Chicago.	30.00	29.70	28.50	21.65
No. 1 wrought, eastern Pa....	35.00	35.00	35.70	27.00
No. 1 wrought, Chicago.....	35.00	35.00	35.00	27.00
Rerolling rails, Chicago.....	35.00	35.30	35.70	25.63
Car wheels, Chicago.....	30.00	30.40	27.50	18.31

(For Additional Prices See Page 460)

Iron Supply Problem More Pressing

Recent Loss of Production Aggravates Difficulties of Makers in Filling Demands—Growing Government Allocations Become More Important Factor—Much First Half Tonnage to be Carried Over—Prorate Sales

Cleveland, Feb. 12.—How the many pig iron consumers who are coming into the market steadily are going to be fully satisfied, is the question that is arising for constantly graver consideration. The increasing tonnage being allocated by the government on top of the recent losses of production which have aggravated an already short supply, makes it impossible for the furnaces to meet more than a fraction of present inquiries. Makers have been obliged to cut their acceptances to only a third or a quarter of the face amount of inquiries in many cases. Only regular customers are being accommodated and those with war work are receiving preference. There is a growing insistence that the government will be obliged to exercise stricter control over purchases and distribution if the furnaces are to meet all essential needs. Some consumers of other than steelmaking grades in this district also are facing a problem because certain local furnaces from which they draw their supplies are running exclusively on basic for war requirements. It is generally understood these furnaces have made additional heavy bookings of basic recently which will absorb their full output for months. Many basic buyers still are hunting tonnage and there has been one important addition to this list in a valley consumer. A Marion, O., plant wants 3850 tons of basic and 650 tons of foundry for first and second half; a Wheeling foundry interest is out for 5500 tons of foundry and 2500 tons of low phosphorus for second quarter and last half. The Westinghouse inquiry remains unsettled. Government representatives have allocated a new requirement of 4200 tons of foundry and 300 tons of charcoal for March-June shipment to the American Shipbuilding Co., and 1200 tons of foundry for Bay City, Mich., delivery. For the navy, 200 tons of charcoal additional has been placed. A local maker is a more active seller of last half foundry and malleable in this territory. Furnace operations are less erratic.

New England Inquiry Less

Boston, Feb. 11.—The past week has developed no improvement in the local pig iron situation. If anything, matters are worse than they have been, for hitherto there has been no lack of inquiry and a considerable tonnage might have been placed if there were makers who would take it. During the past week, however, the inquiry has tapered down, for buyers have come to the conclusion that it is futile to put out requests for tonnage. Between the fact that current production is far below normal and deliveries on existing contracts are seriously hampered by the lack of anything remotely approaching normal transportation facilities, the impression is gaining ground that the furnaces will have to carry much first half business over into the last half and that the amount of iron available for second half will be reduced by that amount. Shipments to this territory are described as "something fierce", and not much improvement is looked for until the weather breaks the railroad blockade which now exists. The railroad situation actually governs the iron market at present and the weather controls the railroad situation. The trade naturally is hop-

ing for an early spring, to clear the tracks and at the same time expedite the movement to this section of the iron owed local users on contract. There is a good business being done in coke for delivery after July 1, with a considerable tonnage already booked for six months and a year. The business is in local by-product oven coke, for no Connellsville is offered at present.

Selling Slows Down

New York, Feb. 9.—Most of the furnaces which recently were selling foundry iron for second half have withdrawn, their booking being as large as they feel justified in taking on at this time. Production has been interfered with to so marked an extent by the shortage of coke during recent months that all makers are far behind in deliveries and of necessity will carry a large first half tonnage into the second half. It is understood the Worthington Pump & Machinery Corp. recently closed for 7500 tons of foundry, charcoal and silvery iron for second half delivery to its various plants. The only sales now being made are occasional small tonnages of off-iron. Demand is fairly active, but the tonnage wanted and the number of inquiries are not as large as has been usual of late. This change appears to be due entirely to a realization by consumers that the iron is not to be had. Not only is it most difficult to sustain blast furnace operations due to inability to ship coke but it is even more difficult to get iron through to consuming points. Only occasional small shipments for which the consumers have secured government permits are being taken by the railroads. In various eastern industrial centers, consumers are helping each other out on raw materials. It is not unusual for one melter to borrow 10 to 15 tons from another to take him through a day's heat. Export inquiries which involve large tonnages continue to come out but they are not taken seriously due not only to the lack of iron but to inability to secure government permits. Some moderate tonnages of southern iron which have been held at southern ports for several months, are prevented from being sold due to impossibility to get government permits. This iron originally was sold to Sweden but could not be shipped. Inasmuch as it was shipped to tidewater at export freight rates, the railroads refuse to release it for anything except foreign destinations. Therefore, it is impossible to move it in any direction. The interstate commerce commission has been requested to release this iron for domestic sale.

Sold Up for Last Half

Pittsburgh, Feb. 12.—Some large merchant furnace interests have completed their bookings for last half shipment and have withdrawn from the market. They confined their commitments to their regular trade and were compelled to decline much business from other sources. Other producers continue to take tonnages from old customers, but are not actively seeking business. A Wheeling consumer is out for 8000 tons of foundry and low phosphorus. The Westinghouse Electric & Mfg. Co. has not closed on its last half inquiry for Nos. 1, 2 and 3 foundry and bessemer iron. Basic remains in great demand but all these requests cannot be met. A valley steelmaker has been sounding the market. Blast furnace operations have shown but little improvement in this district and probably do not exceed 50 per cent of capacity. Coke is moving more freely, however, and provided the present favorable weather conditions continue, a quick and marked betterment appears to be certain. The Carnegie Steel Co. is operating 33 of its 59 furnaces.

Operations Little Improved

Buffalo, Feb. 12.—Operating problems, not sales augmentation, continues to engross the attention of blast furnace interests throughout this district. The situation is not changed a great deal in its more general aspect from a week ago, though operators admit a little more freedom in the way of coke and raw material shipments. From present indications it would not appear that February would be very strongly in contrast to January, and some operators go so far as to predict a still more serious fuel situation in the near future. They point out that due to poor handling of cars and other adverse conditions at the ovens, there was a period of three or four days, a while back, in which no coke was loaded. This break in the continuity of loading is going to hit local furnaces soon, though supplies for the very immediate future may loosen somewhat, through the medium of warmer weather and better car movements. Some of the largest producers still are compelled to pile iron because of the lack of cars. There are large accumulations of iron at the furnaces and steel at the mills which cannot be shipped because of car shortage and embargoes. There are only a few points to which iron can be forwarded. One producer describes the situation as at "a chaotic standstill". There is a constant flow of inquiry for all grades but sales have been light. Basic has been inquired for in good tonnages but has gone unsatisfied. One interest reports a sale of 1000 tons of foundry for first quarter. Another interest will take care of certain customers who will run out of iron during the first half. In this particular case first half delivery will take in the first part and probably the entire month of September. There is quite a scramble for last half material but buyers now are commencing to realize what the producers have been telling them for a long time—that there is a real shortage of pig iron.

Chicago Buying Heavily

Chicago, Feb. 12.—Selling of pig iron for last half delivery is being carried on steadily by local makers and probably more than 50 per cent of last half production already has been covered. Inquiry is being made by practically all melters and producers are booking tonnage in proportion to former purchases in the effort to make last half production cover as much ground as possible. It is believed from present indications that all this iron will be under contract by the end of this month. Southern iron seems scarce and a number of producers are selling their iron largely in the south. Receipts of iron from the south are unusually light at present on account of embargoes at almost all Ohio river crossings. What iron does come through is being taken in spite of embargoes by the Illinois Central railroad at Evansville and the Frisco railroad at St. Louis. Most foundries are having difficulty in obtaining sufficient iron as the rule is that furnaces are much behind on contract deliveries. Silvery iron is almost impossible to obtain. A northern Illinois sewing machine manufacturer is inquiring for a moderate tonnage for second and third quarter delivery. A Chicago machinery manufacturer, mentioned last week as inquiring for a round tonnage of various grades, has bought some malleable for second quarter and last half but has not yet covered its entire requirements.

Southern Makers Sell

Cincinnati, Feb. 11.—A report is in circulation that a southern Ohio furnace has sold some bessemer ferrosilicon for second half shipment. The tonnage is unknown, but it is understood that only two or three sales were made, all the iron carrying 10 per cent silicon. It is also a matter of conjecture as to whether this maker has any

more to offer for last half delivery. Ohio silvery iron still is unobtainable. Southern foundry iron continues to be sold for last half shipment, and several lots of No. 3 and gray forge have been disposed of for shipment in both the second and third quarters. The last half tonnage of southern sold last week was considerable. The inquiry for southern iron is showing some improvement, but the bulk of the iron wanted is strictly No. 2 foundry based on the old grading of 2.25 to 2.75 silicon, which carries an advance of 50 cents a ton over the base price set by the government on a silicon content of 1.75 to 2.25 per cent. Off grade coke makes the production of strictly No. 2, according to the former grading, a difficult matter, and there is none to be had for nearby shipment.

Eastern Inquiry Drops

Philadelphia, Feb. 12.—Demand for second half pig iron in this district has slumped and inquiry has settled down to small scattered lots. The additional holiday this week has been a factor in this inactivity. Efforts of consumers now are being devoted largely to obtaining material held up by embargoes, and these have been stimulated by the improved weather conditions and the three days' respite in trading. A few odd lots of pipe iron have been sold, the largest of which will go to a Virginia consumer. Several hundred tons of 8 per cent silveries were closed, chiefly by a New York electrical manufacturer.

Heavy Inquiry at St. Louis

St. Louis, Feb. 9.—Sales of fairly liberal tonnages of southern iron for second half were closed the past week. One of the main producers in Alabama reported business for the first week of this month on a parity with the same week in January, which was one of its heaviest months in this particular district. Northern furnaces are offering nothing, and makers in other sections are entirely out of the market. The general inquiry is excellent, even urgent. Including all grades, it is safe to say that current inquiries easily would aggregate 50,000 tons.

Production is Improving

Birmingham, Ala., Feb. 12.—Practically the make of pig iron is being sold steadily in the south, although some of the furnaces have not as yet, opened their books for the last half of the year. Transportation is a little improved this week, though embargoes and congestion still prevail in several directions. Production is improving owing to the favorable weather conditions.

Coke Situation Improving

Movement of Shipments Best in Many Weeks—Furnace Supplies More Ample—Consumers Oppose Pooling Plan

Pittsburgh, Feb. 12.—Due to the moderated weather coke shipments are moving much more freely than they were one week ago. Some furnaces yesterday succeeded in obtaining 100 per cent of their supplies, although this is far from being typical of the general situation. The traffic congestion in the Connellsville region is being cleared up rapidly. Considerable headway is being made in delivering cars which have been tied up at junction points. The tracks of the Pittsburgh & Lake Erie railroad are in an exceptionally good condition and that road today placed 100 per cent car supply at Jacob's creek and Dickerson's run districts and a 50 per cent supply in the Newell district for delivery to the Monongahela railroad. The car supply yesterday in the region was about 65 per cent, while the general average today was only 30 per cent and a like average is estimated for tomorrow. The reason for the reduced averages appears to be due to the lack of motive power and to a shortage of railroad labor, together with the fact that large consignments have been moved forward, and empty cars will not become available until they are unloaded and returned. The congestion on the Pennsylvania lines continues to be rather severe but present weather conditions are described as being ideal for the moving of traffic and the situation in the Connellsville region will be cleared up greatly in a short time if bad weather does not intervene. Railroad operators held a meeting yesterday in Washington with the fuel administration and discussed plans looking to the pooling of shipments of coke. Blast furnace interests generally are opposed to this plan, claiming that it would interfere with the shipment of the regular grades of coke conforming to their usual practice. Low phosphorus coke, however, would not be included in the pooling system if it were adopted. Production during the week ending Feb. 2 was 214,758 tons, as compared with 221,735 tons during the preceding week according to the *Connellsville Courier*.

By-product Shows Disparity

New York, Feb. 9.—Considerable disparity, from a geographical standpoint, separates the prices for by-product coke which are being obtained by the two eastern producers. The New England maker is entitled by the ruling of the fuel administrator to a maximum selling price of $13.94, ovens, or $7, base Connellsville, plus $3.65, freight from the Connellsville district and the rail and water freight on coal from Virginia. The full maximum so far has not been asked by this producer; all of its business so far has been at $13.45, ovens, or 49 cents less. The maximum selling price allowed the New Jersey producer by the fuel administration is $9.25, which is obtained by adding $2.25, the freight on coal from Latrobe, Pa., to the ovens, to the $7 base. Inasmuch as the freight between the two producing points is less than $3, the Boston delivered price of the New Jersey by-product coke would be less than $12.25, compared with $13.45, ovens, at which the New England producer has booked well over 100,000 tons for New England delivery. Both of these producers continue to keep their books open for contracts for delivery over the remainder of this year and over the year beginning July 1. Eastern consumers now are pretty well covered ahead, so that the volume of business during the past week has not been much less than recently.

Relief Still Deferred

Cincinnati, Feb. 11.—According to reports from all of the producing districts, no relief has been experienced in transportation delays. The car supply is short, and even when coke is loaded it is hard to get it moved. Labor is also still giving much trouble. Although little foundry coke has been received locally within the past few days, foundrymen are operating their plants.

Some Encouragement Felt

St. Louis, Feb. 9.—Milder weather and some loosening up of the railroad situation have raised hopes of consumers of coke to some extent, but a scarcity causing keen apprehension still remains. Inquiries continue vastly greater in volume than available supplies. Deliveries on contract, while still woefully backward, were a bit more encouraging this week. Several plants reported arrivals equal to 75 per cent of engagements. Eastern ovens are offering nothing for any delivery. Their stock reply to all inquiries is that they are making sufficient coke only to fill contracts.

Shell Scrap Coming Out

Output of Munition Works Now Appearing Expected to be Market Factor—Small Betterment in Trading

FOR COMPLETE PRICES SEE PAGE 460

Cleveland, Feb. 12.—Some dealers in iron and steel scrap in this district are laying their lines to capture the defective shell and shell turning business, shellmaking being scheduled to be in full blast in about 30 days. Considerable quantities of both grades are expected to be on the market. Open weather has brought about some improvement in traffic conditions, but the full benefit is not expected for another week or 10 days. While no tonnages are being handled, some carload lots are changing hands. The sag in prices that has been noted in some other cities has not made its appearance in this district. Permits for shipment are somewhat easier to obtain, but are not so greatly in demand since government price-fixing has tended all along to localize the scrap business and producers are not in the market. No change in prices has occurred in the past week.

Catch Up On Orders

New York, Feb. 13.—Moderated weather and an additional holiday tended to work at cross purposes in the New York scrap market during the past week. Virtually all the yards, however, allowed nothing to interfere with the handling of shipments and the practical cessation of business from Saturday noon until Wednesday allowed them in a measure to catch up with their orders. Prices during the past week have been unchanged. Nothing yet has developed in the matter of further price rulings by the American Iron and Steel institute, but the first meeting of the new subcommittee on scrap has been called for Feb. 14 in this city.

Await Clearing of Embargoes

Boston, Feb. 11.—The railroad situation continues restrictive to business in steel and iron scrap, but the demand remains and a big tonnage of business is promised once the tracks are clear and there are no embargoes to interfere with shipments. Most of the New England foundries being bound to observe the fuel conservation order by shutting down on Mondays are not as heavy buyers as they would be if they were running the full week. The consequent slight falling off in the local demand is thought to be only a temporary condition. Meanwhile, prices hold very firm in all lines, for supplies are anything but burdensome. Wholesale dealers' paying price per gross f.o.b. shipping points, follow: Wrought No. 1, yard long, $30 to $31; horseshoes, $30 to $31; cotton ties, $21 to $22; stove plate, $20 to $20.50; No. 1 machinery, $33.50 to $34.50; No. 2 machinery, $28 to $29; car axles, iron, $43 to $44; steel, $43 to $44; rerolling rails, $30.50 to $31; iron boiler plate, $34 to $35; bundled barrel hoops, $17.50 to $18; wrought iron pipe, new specifications, $27 to $28; steel rails, $26 to $27; No. 1 railroad steel, $26 to $26.50; heavy melting steel, $25.50 to $26.50; axle turnings, $21 to $21.50; machine shop turnings, $15 to $16; cast borings, $16 to $17; drop forge trimmings, $21 to $22; cast iron car wheels, mill price, $35 to $37.

Little Business Moving

Pittsburgh, Feb. 12.—Sales of scrap in this district have been almost entirely lacking. Severe weather conditions which prevailed part of that period intensified the dullness of a market that has been stagnant for a long time. Traffic movement having improved as the result of the comparatively mild temperature of the past few days, it is believed that scrap will move more freely soon. While the demand, made quietly, has exceeded the supply, it has been restricted considerably on account of the curtailed consuming operations which now are increasing after a protracted siege of shutdowns.

Can't Move Material

Buffalo, Feb. 12.—Transactions for the week have been very limited due to the fact that nothing can be moved if it is sold. There has been no improvement in conditions notwithstanding the moderating of weather conditions. It is impossible to make any shipments except by means of a special permit which takes days to secure. Scrap men hope that the new scrap committee, recently appointed, will be able to evolve some improvement which will more clearly define classification of grades hitherto untouched by the government. Present prices are holding firm and there is a well-defined scarcity of heavy melting steel, cast scrap, malleable and car wheels. The production of some shell factories is beginning to make itself felt, though faintly as yet. Turnings and low phosphorus shell ends are beginning to come out. Larger tonnages should soon be available.

Chicago Market Dull

Chicago, Feb. 12.—Trading in iron and steel scrap is at a minimum in this district due to a number of reasons. Movement of cars by railroads is slow and a large tonnage of materials is in transit, delayed for weeks by storms and blockades. Consumption is cut down to a low mark by inability of users to operate at anything like capacity. In the same degree the production of new scrap is limited by lessened activity of manufacturing processes. Another factor is found on the financial side, most dealers finding it difficult to obtain sufficient funds to operate under the circumstances without lessening the volume of their trading. Some buying is being done steadily but material moves slowly to consumers at best. It is believed that as soon as transportation becomes more active and fuel more plentiful, a heavy demand for scrap will develop as reserve stocks are low and demand for finished material is heavy. Prices are a shade weaker in some grades, though most of the list has resisted the downward pressure brought by smaller dealers offering a concession to move their accumulations. The Union Pacific offers 4400 tons including 800 tons of steel rails and 1400 tons of car wheels. The latter is the largest tonnage of wheels on the western market in several months. The Wabash offers 1425 tons, the Monon 950 tons, the Chicago & Eastern Illinois 500 tons and the Chicago, Milwaukee & St. Paul 300 tons.

Consumers Show More Interest

St. Louis, Feb. 9.—The market for iron and steel scrap continues dull and uninteresting. However, a hopeful element was injected into the situation by a little more show of interest on the part of consumers than was the case during the preceding week. Depleted stocks, it is said, will soon compel certain important melters to purchase. Difficulty in obtaining cars and labor, and the inactivity of capital tied up in delayed shipments all make dealers and brokers loath to push matters. The mild weather of the past few days, if it endures, will relieve the badly congested railroad condition. Railroad offerings are in a little better volume. Unless a large tonnage of scrap tied up in transit, however, soon reaches its destination, consumers are likely to be brought soon to a realization that there is an acute shortage of material throughout the country. Offerings from the car-

riers this week were as follows: Wabash, 3000 tons; Pere Marquette, 1400 tons; Seaboard Air Line, 1400 tons; Texas & Pacific, 700 tons; Chicago & Eastern Illinois, 600 tons, and Mobile & Ohio, 300 tons.

Market is Nominal

Cincinnati, Feb. 11.—Although the weather conditions are more favorable, no new scrap transactions have been made lately. In the absence of any definite transactions, no proper gage of prices can be established. Whether firm offers would be accepted at prices much below the government's schedule is a matter that cannot now be determined. There is a large amount of scrap due on contracts with mills in the Cleveland and Pittsburgh districts, but none of it can be moved. As soon as the railroad embargoes are raised, dealers state there will be heavy buying for future shipment, but at the moment, melters are not committing themselves ahead. One reason for this is the knowledge that nothing higher than government prices can be made, and the only advantage in purchasing ahead would be to guarantee a full supply of scrap.

South Shows Weakness

Birmingham, Ala., Feb. 12.—Some weakness is shown in the scrap market in the south, though but little change is noted in quotations. Embargoes and scarcity of railroad cars still are present. It remains a difficult matter to get transportation in practically all directions and nothing at all to the north and east. Southern consumers are paying a little better price for heavy melting steel. Quotations largely are nominal that if purchases were to be made there might be some concessions obtained. Current supplies are a little better. There is hesitation on the part of dealers as to buying in quantity.

Building Contract Data

Statistics of building and engineering operations compiled by the F. W. Dodge Co. and based on the valuation of contracts awarded show that in the district east of the Missouri and north of the Ohio rivers, contracts awarded during 1917 totaled $1,618,157,000. In 1916 the valuation of similar contracts was $1,356,989,397 and in 1915, $940,089,334. Data compiled for the districts of western Pennsylvania, West Virginia and Ohio, give the value of contracts let for similar operations in 1917 as $212,220,000; in 1916, as $165,180,000, and in 1915, as $100,341,000.

Sheet Bar Lack Extensive

Unfilled Requirements of 50,000 Tons in Northern Ohio—No Open-Hearth Offered and Bessemer Output Reduced

Cleveland, Feb. 12.—A tremendous unsatisfied demand for sheet bars remains in the market and it is estimated that 50,000 tons could be placed immediately in Cleveland and surrounding territory. Sheet producers have informed the steelmakers they will take all bars of whatever character they may have to offer. Some of them have been even suggested a willingness to pay premiums if this would bring forth material. Such offers have not been entertained. A divergent case as to steel shortage refers to one northern Ohio sheet mill with its own open-hearth plant. This mill is piling ingots and not rolling them into sheet bars because it is unable to ship its finished product, by reason of traffic congestion.

Production Shows Increase

Pittsburgh, Feb. 12.—The sharp reduction in the output of billets and sheet bars, partly due to the transportation situation, has been overcome somewhat by reason of the mild weather but mills still are suffering from a shortage of pig iron and fuel. Inquiries from domestic consumers are limited, although tonnages are greatly needed but it is realized that they are not obtainable. The output of tin plate and sheet mills, particularly the latter, has been curtailed greatly on account of their inability to obtain sufficient supplies of sheet bars. Small inquiries for discard billets are being made, principally by brokers, some of whom have succeeded in selling small tonnages. Fairly active demand exists for wire rods but some makers in this district are out of the market on account of the scarcity of steel. They are committed fully for several months. Export demand for rods is active and sales have been made to Canada, Italy and the orient.

Suppy is Cut Down

Youngstown, O., Feb. 13.—Sheet bar supply is greatly reduced, although the valley finishing mills have not as yet felt any pinch. Most of the mills have a fair-sized tonnage in stock. Government requirements for shell steel and plates are so heavy that practically no open-hearth stock is available for other purposes. One maker of sheet bars states that his finishing mills are being supplied solely with bessemer steel on this account and at times even this grade is limited to such an extent that the bar mill operates at reduced capacity. Where 2000 tons were supplied previously weekly, only 1000 tons now are available, due to the decreased production of the bessemer converters arising from weather and transportation difficulties.

Strip Buying Still Withheld

Pittsburgh, Feb. 12.—Domestic consumers are still withholding inquiries for cold rolled strip steel. Some producers are of the opinion that automobile and other interests will not actively enter the market until after April 1, when prices are subject to revision, although improved weather and traffic conditions may develop increased business in these lines sooner than that date.

Ferro Strong

And Sales Reported Above $250—Ore Uncertainty Continues

Pittsburgh, Feb. 12.—The market for ferroalloys is strong. Small tonnages of 80 per cent ferromanganese have been sold during the past week at $250, delivered, for spot shipment, and this figure appears to represent the market, although there are unverified reports that tonnages have gone at $255, delivered. Demand for 50 per cent ferrosilicon is active and comes principally from small consumers who have not covered their requirements. One sale, involving a limited lot, was made in this district last week at $185, delivered, for March shipment and another, calling for only a few tons, went at $200, for spot delivery. The market appears to be quotable at $180, delivered. Demand for the lower grades of bessemer ferrosilicon also is active but makers generally are making no offering, being committed for the first quarter and unwilling to quote beyond that period. Small tonnages of 20 per cent spiegeleisen have been sold at $60, furnace, for spot delivery.

Chicago Ferro Unchanged

Chicago, Feb. 12.—Ferromanganese from the local stack continues to be quoted at $250, furnace, but comparatively little is being sold and the maker is unwilling to obligate himself until the ore situation becomes more settled.

Need Heavy Chain Tonnage

Fleet Corporation to Require 45,000 Tons—Buying Bars for War Vehicles—Lift Contract Suspensions to Auto Trade

Pittsburgh, Feb. 12.—Chain makers in this district have large orders booked and one producer who has enough business to insure capacity operations for two years is under a schedule calling for operations up till next December. Preference in tonnages is given to the government and to railroads, both of which are buying freely. The Columbus, O., plant of the American Chain Co. is making material up to 3 inches for the government and is building a plant at Norfolk, Va., where it will produce 1⅞-inch stub link for the government. It is estimated that the Emergency Fleet corporation will require 45,000 tons of 2½-inch stub link chain for 1000 boats building or to be built. This is based on the estimate that each boat will require 1620 feet of this size of chain, there being about 60 pounds in each foot of 2½-inch stub link.

Bar Tonnage Light

Chicago, Feb. 12.—Mill operation is much below normal with production and shipments correspondingly small. The leading interest has less than 50 per cent of capacity active, due to lack of fuel and shortage of cars. Other producers are almost as much hampered but in some cases are somewhat more fortunately situated. Fair inquiry is current for soft steel bars, with light tonnage being booked from private consumers. Specifications are being filed fully on contracts now on books, consumers apparently desiring all the material they can obtain. Practically all consumers in this territory have material coming on their 1917 contracts and are receiving some tonnage to meet their more pressing needs. Bar iron is quiet, with most mills working against bookings sufficient for first quarter operation and some tonnage for later delivery. An attractive inquiry for 35,000 pieces of iron for wagon tires, about 600 tons, probably for government vehicles, has not yet been placed. This is thought to be for 7000 to 8000 wagons. Hard steel bars are quiet and mills are working only part time. Lack of fuel is the greatest drawback, though tonnage booked is not heavy.

Operations Increase Somewhat

Pittsburgh, Feb. 12.—Operations of bar mills have increased somewhat during the past week and are estimated at about 60 per cent of capacity. There continues to be an acute scarcity of steel and fuel, however, though these supplies are moving in greater volume to mills since milder weather set in and traffic congestion is being relieved gradually. Implement makers are specifying freely for second quarter delivery and are making inquiries for second half needs. Producers are well booked for the first quarter and are making no offering for that shipment. Makers of iron bars are operating heavily on government work and cannot take tonnages for spot delivery from domestic buyers. Some of them are not quoting on second quarter business. Small demand for reinforcing bars exists. Limited tonnages are being taken from warehouses where shipments can be made.

Buying Steel for Trucks

Cleveland, Feb. 12.—Steel now is being purchased for the new award of 4500 trailers for motor trucks for the army, which has been distributed among various builders. One plant in this city will build 1500 of these vehicles. Some hard steel bars are being bought for this requirement. The automobile situation continues to clear up, as the builders, because of recent sales, are able to lay out definite manufacturing policies. This betterment of the outlook has been communicated to the parts manufacturers who are expected to take up the question of future steel needs more actively in the near future. Suspensions of unspecified portions of contracts expiring Jan. 1, which were allowed to these consumers by certain large steelmakers, now have been lifted in view of the better-defined prospects. Bids have been taken from the manufacturers on the large government inquiries for bolts recently noted, but no awards yet have been made. It develops that 55,000,000 of these bolts are wanted for the engineers' depot and 20,000,000 to 30,000,000 for the quartermaster's department.

Hoop Market Unchanged

Pittsburgh, Feb. 12.—The market for hoops and bands remains unchanged. Production is at about 50 per cent of capacity. Demand for hoop steel for first quarter shipment is fairly active and sales are being made at the government price of 3.50c, Pittsburgh. The market for bands is dull.

Market is Quiet

Pittsburgh, Feb. 12.—The domestic market for cold rolled shafting remain quiet. Considerable tonnage is being produced for the government.

Government Buys Heavily

Pittsburgh, Feb. 12.—The government is a heavy buyer of nuts, bolts and rivets. So far as known the government has not yet distributed tonnages in connection with inquiries recently put out for 100,000,000 bolts. Makers in this district say that the market is firm and that no sales are being made at prices below levels established by the government. They say they have no knowledge of bids for rivets said to have been opened last week by the bureau of supplies and accounts, navy department, when it is stated some quotations ran as much as $30 a ton under the regular government levels. Makers claim it would be impossible to purchase steel bars at the government price of 2.90c, Pittsburgh, or $58 per ton, and to produce rivets at a profit through this reduction or any cut even approaching it. They point out that present prices of $4.75 per 100 pounds for structural rivets and $4.65 per 100 pounds for cone head rivets, Pittsburgh, leaves only a narrow margin of profit. Some producers whose plants were on the verge of being closed down on account of traffic congestion in their yards report the railroad situation is much improved and they are again able to obtain steel bars and to make shipments of their finished products without much difficulty.

Government Orders

In Pipe May Help Dragging Demand —Southern Output Droops

New York, Feb. 11.—Increased demand from the government is the outstanding feature of the cast iron pipe market in this district. Among the larger projects now under construction for the government, requiring quantities of cast iron pipe, are the two powder mills being erected by the Thompson-Starrett Co. and the Du Pont interests. The foundries are well booked with orders for the special castings and smaller sized pipe, but would find demand for the larger sizes particularly desirable. Owing to the tight money market, many cities are covering for only urgent needs. Export buying continues small. Nevertheless, it is believed that as the

needs for cast iron pipe abroad become more and more urgent, there will be a greater tendency on the part of export buyers to meet the demands of American sellers. These latter interests are willing to sell material for delivery at tidewater, but refuse to accept the responsibility of obtaining ships.

Oil Country Goods Wanted

Pittsburgh, Feb. 12.—Inquiries are being made by oil country interests for iron and steel lap weld pipe and some producers are understood to be about ready to take sizable tonnages. Others are out of the market and are far behind on shipments. Provided there is no interference by the government, the oil trade is expected to see the most active year of its history in 1918 and will require great quantities of pipe, perhaps mostly of 8-inch size.

Mill Production Reduced

Youngstown, O., Feb. 13.—Production of pipe in this district has been curtailed. This is due to the shortage of pig iron arising from the shortage of coke and present traffic conditions. The leading pipemaker states that two of his blast furnaces still are banked, and the output of the active stacks is being used for other products. Demand has fallen off considerably. While the government is not buying pipe directly, fair-sized tonnages continue to be consigned to consumers turning out government work.

Cities Slow to Buy

Chicago, Feb. 12.—Though some activity in the cast iron pipe market has been manifested in inquiries received recently it has not resulted in tonnage being placed as cities are slow to contract at present prices, compared with what was paid a year ago. Bids on 500 tons at Toledo, O., have been rejected. Figures were opened last week at St. Paul on 438 tons and at Minneapolis on 1466 tons, but no award has been made. Bids will be opened Feb. 16 at Milwaukee on 900 tons.

New Business Still Lags

Birmingham, Ala., Feb. 12.—The cast iron pipe trade in the south still lags. Considerable has been heard recently of expected new inquiries for pipe, but there has been no realization. The melt is off as compared to what was on a few months ago. Soil pipe plants are down entirely, but there is some selling from stock. Negotiations continue for cast iron pipe for Central and South America.

Embargoes Block Sheets

Continuing Ban on Eastern Shipments Keeps Production Low—Government Still Buying—Galvanized Grades in Demand

Youngstown, O., Feb. 13.—Embargoes on all shipments east still are in effect and as a result a majority of the sheet mills continue to operate below normal. The intermittent operation of valley blast furnaces has also affected their production to a considerable extent. Practically no open-hearth sheet bars are obtainable due to the heavy requirements of the government for this grade of steel. One valley interest has not rolled sheet bars of any kind for over two weeks. Bessemer plants in this and nearby districts have operated nowhere near normal for the past month and what tonnages they did blow were diverted to the finishing mills. Sheet mills not self-contained are even finding it difficult to obtain bessemer bars and are drawing heavily on stocks. Inquiries are coming out freely, nevertheless. Most of them are for black and galvanized grades. Medium size orders have been accepted from buyers who are not clamoring for immediate delivery but are satisfied to receive the product in from 10 to 12 weeks.

Government Still Buys

Pittsburgh, Feb. 12.—Requirements of the government for sheets continue to be placed with mills in liberal volume, the demand being for galvanized and blue annealed grades principally. Producers are not taking any tonnages from domestic consumers, having allotted their output for galvanized sheets for the first quarter and for blue annealed and black for the second half. The demand from commercial interests for galvanized sheets for the second quarter continues to be persistent but it is not known when mills will open their books for this business. The government requirements are great at present with no prospect of diminishing at an early date and this makes it uncertain as to the position manufacturers will be in to take care of domestic consumers. Operations continue to be low on account of a scarcity of sheet bars and the railroad situation and perhaps do not exceed 40 per cent in this district.

Suffer Oil Shortage

Because efforts have been concentrated upon the movement of coal, coke and food, many tank cars containing fuel oil have been side-tracked and there have been comparatively few arrivals from the oil fields, particularly in northern Ohio. As a result, several forge shops, nut, bolt and rivet factories, etc., are experiencing a serious shortage. While others have been and are facing and experiencing a coal and coke dearth, these shops are facing daily a forced shutdown. One large Cleveland forging and machine company which was exceptionally well supplied with oil, has diverted several of its cars to help out others in that territory. Many of these shops are turning out material for government work.

Wire Mills

Resuming After Several Weeks' Shutdown—Jobbers Are Buying Nails

Cleveland, Feb. 12.—After having lost from four to five weeks' production, wire and nail mills of the American Steel & Wire Co. in this district are resuming this week. Loss of output in this line has been heavy. Suspension of the nail and wire mills has been due to the lack of semifinished material caused by forced shut-down of steel works. Apart from buying of nails by jobbers for the next 60 days delivery, there is little market activity. Despite their reduced output, makers are not being pressed for deliveries by consumers, since the requirements of the latter have been equally cut down by recent operating difficulties.

Jobbers Taking Nails

Pittsburgh, Feb. 12.—Jobbers are buying nails for second quarter shipment rather freely and government requirements are large. Demand for wire is only fairly active. Some mills, whose loss of tonnages has been extremely great on account of suspended operations, have been compelled to defer shipments on contracts. Numerous inquiries for spot tonnages have gone unsatisfied both because of a shortage of steel and on account of railroad embargoes.

The Canadian commission of conservation estimates the total possible water-power resources of the Dominion at 18,803,000 horsepower, while the developed water-power is but 1,813,210 horsepower.

Radio Towers Are Awarded

Pittsburgh Interest to Supply 4000 Tons for France—Official Orders for 2500 Airplane Shelters Still Awaited

Pittsburgh, Feb. 12.—The Pittsburgh Des Moines Steel Co. has been awarded a contract by the navy department for approximately 4000 tons of structural material for seven 820-foot radio towers which are to be erected in France. Anchor materials are to be delivered in 30 days, for bar portals in 60 days and the complete shipment of the entire tonnage is to be made within 75 days. It is understood that after the war these towers will be sold by the United States to the French government. Inquiries for structural material from private sources are extremely limited and it is probable the commercial market will continue to be dull for some time. The National Association of Builders' Exchange at its seventh annual meeting here last week went on record against encouraging the building of any homes that were not essential. The convention is endeavoring to federalize the industry in order to establish closer co-operation with the government for the supplying of labor and materials in connection with the war.

Await Final Shelter Awards

New York, Feb. 13.—Practically all of the attention of fabricators at this time continues to be centered on work directly or indirectly connected with the government's war program. The allotment of 2500 airplane shelters for use of the American expeditionary forces in France, recently reported, apparently has not been decided upon definitely due to the difficulty of some of the shops in obtaining raw material for these contracts in specified time. However, it is understood that the original allotment remains tentatively unchanged, with the leading awards as follows: McClintic-Marshall Co., 500 shelters; Fort Pitt Bridge Works, 500; and Belmont Iron Works, 500. Among the smaller contracts are 100 shelters to Levering & Garrigues, 36 to the Ferguson Steel & Iron Co., and 60 to L. F. Shoemaker & Co. Each of these buildings call for 35 tons of structural steel. Commercial business in this market continues negligible.

Some Building Comes Out

Chicago, Feb. 12.—Although construction work is at a low ebb and demand for structural steel for this purpose is small, occasional contracts are being closed. The office building of the Western Union Telegraph Co., this city, 2400 tons, has been awarded to the South Halsted Street Iron Works. It will be principally Bethlehem sections. The steel for the Butler Bros. warehouse has not yet been awarded. Various projects connected with the new Union station in Chicago are assuming form, freight warehouses being under construction adjacent to the station site. The John Griffith & Sons Co. has been given the general contract for the Chicago, Burlington & Quincy freight warehouse and is at work also on the warehouse the Union Station Co. will erect for Butler Bros.

CONTRACTS AWARDED

Additions to plant of Atlas Crucible Steel Co., Dunkirk, N. Y., 400 tons, to Pittsburgh Bridge & Iron Co.

Roundhouse for Louisville & Nashville railroad, Nashville, Tenn., 275 tons, to Snead Architectural Iron Works.

Two government alcohol plants in Pennsylvania, 1000 tons, to the Hay Foundry & Iron Works.

Building for Western Union Telegraph Co., Chicago, 2400 tons, to South Halsted Street Iron Works. (Bethlehem sections.)

Seven radio towers for navy department for erection in France, 4000 tons, to Pittsburgh-Des Moines Steel Co.

Uniform Types

Of Railroad Equipment are Contemplated by Director McAdoo

New York, Feb. 12.—Standardization of railroad equipment is contemplated by Director General of Railroads McAdoo, according to Washington advices. The division of finance and purchases of the railroad administration, headed by John Skelton Williams, will plan such reforms as are needed, in co-operation with railroad executives and manufacturers. Mr. Williams soon is to enlist railroad purchasing agents in one association to be supervised by the administration, in order to co-ordinate efforts and to eliminate much competion in railroad buying. Director McAdoo yesterday took over the commission on car service of the American Railway association and created a car service section of the division of transportation with W. C. Kendall as manager. Recently the director general sent letters to leading roads, asking for complete information as to new equipment, additions, betterments, etc., already contracted for or which are considered necessary this year.

Car builders are in a much better position as to supplies of raw material and are able to take on considerable new business. The largest car order to be reported is for 1000 ventilator cars by the Atlantic Coast line, which went to the Standard Steel Car Co. Construction of 6500 box cars for the Russian commission, which had been placed with the American Car & Foundry Co., has been indefinitely postponed.

According to a published report, the purchases of railroad equipment for the American expeditionary force in France to date call for several hundred locomotives, 12,000 box cars, 600 ballast cars, 100,000 tons of rails, 500,000 ties, 600 miles of telephone wire and apparatus and miscellaneous supplies.

Jobbers Put Out Inquiries

Pittsburgh, Feb. 12.—Increased inquiries for small spikes are being made by jobbers. Sales being made are limited. Producers who have booked good sized tonnages find themselves unable to ship on account of railroad embargoes and some have withdrawn from the market. Railroads are not showing much interest in the market for standard spikes but some have inquired for lots ranging from 1000 to 2000 kegs. Makers are not actively seeking business owing to a shortage of steel, which has forced some to decline to quote. The market for standard rails continues to be dull. Fair sized tonnages of light rails are being sold at the government figure of 3c. mill, for sections 25 to 45 feet.

Rail Price About $60 Now

Chicago, Feb. 12.—Standard steel rails are continuing to sell at $60 per ton and higher since this product has not been made subject to government regulation. Not much selling of rails was done from a period shortly after the old $40 price was established, until recently. Some tonnages, all small, have been booked and it is understood the price is about $60 per ton. Eastern mills are understood to have taken tonnage at even higher prices. Inquiry continues and small tonnages are being booked to fill out requirements of roads which bought some time ago. No general inquiries by important roads for 1919 delivery have come out yet and it is a problem what price would prevail on such business.

The only activity in car buying is found in the placing by the government of about 4400 cars for use in France. The Pullman Co. has been

given 500 of these and it is understood the Haskell & Barker Car Co. has been given an equal number. Indications are that announced maximum prices on track bolts and spikes are not holding, some business being understood to have been booked at concessions of $1 to $2 per ton.

Small Tonnage

Of Ore Shipped From Docks in January—Quantity in Store

Cleveland, Feb. 12.—The extremely congested condition of the railroads is reflected in the small tonnage of ore shipped from Lake Erie docks during the month of January. Reports of the Lake Superior Iron Ore association show that only 199,091 tons were moved from docks in January, 1918, or less than one-third of the January, 1917, total of 686,227 tons. This leaves a balance of 10,069,592 tons on Lake Erie docks on Feb. 1, 1918, while on the same date last year the tonnage was 9,113,926.

Shipments for the season to date have amounted to 36,029,167 tons, compared with a total for the corresponding period in 1917 of 37,599,227 tons.

The following table shows the balance on docks at Lake Erie ports, Feb. 1, 1918 and 1917:

	Feb. 1, 1918	Feb. 1, 1917
Buffalo and Tonawanda	444,706	409,451
Erie	525,839	614,791
Conneaut	1,503,511	1,170,546
Ashtabula	3,283,864	2,951,828
Fairport	515,214	402,605
Cleveland	1,849,931	1,750,332
Lorain	1,011,100	954,041
Huron	547,502	527,293
Toledo	393,925	338,049

Steel Corporation Orders Increase Slightly

Unfilled bookings of the United States Steel Corp. made a further gain last month, the report as of Jan. 31 indicating an increase of 96,135 tons, or 1.02 per cent. Booked orders aggregated 9,477,853 tons on that date. A factor of importance in the increase was the difficulty in making shipments due to freight congestion. A comparative statement follows:

Date.	Total.	Change, tonnage.	Change, per cent.
Jan. 31, 1918..	9,477,853	96,135+	1.02+
Dec. 31, 1917..	9,381,718	484,612+	5.44+
Nov. 30, 1917..	8,897,106	112,569—	1.24—
Oct. 31, 1917..	9,009,675	823,802—	8.37—
Sep. 30, 1917..	9,833,477	573,572—	5.51—
Aug. 31, 1917..	10,407,049	433,115—	4.16—
July 31, 1917..	10,844,164	539,123—	4.74—
June 30, 1917..	11,383,287	503,304—	4.24—
May 31, 1917..	11,886,591	296,492—	2.43—
Apr. 30, 1917..	12,183,083	471,439+	4.02+
Mar. 31, 1917..	11,711,644	134,947+	1.16+
Feb. 28, 1917..	11,576,697	102,643+	0.90+
Jan. 31, 1917..	11,474,054	73,232—	0.64—
Dec. 31, 1916..	11,547,286	488,744+	4.43+
Nov. 30, 1916..	11,058,542	1,043,282+	10.41+
Oct. 31, 1916..	10,015,260	492,676+	5.18+
Sep. 30, 1916..	9,522,584	137,133—	1.42—
Aug. 31, 1916..	9,660,357	66,765+	.69+
July 31, 1916..	9,593,592	46,866—	0.48—
June 30, 1916..	9,640,458	297,340—	3.09—
May 31, 1916..	9,937,798	108,247+	1.11+
Apr. 30, 1916..	9,829,551	498,550+	5.34+

Allot More Ship Plates

Chicago Mills to Furnish 20,000 Tons of Steel Additional to Pacific Coast—Car Builders Get Better Supplies

Pittsburgh, Feb. 12.—The Pressed Steel Car Co. has been awarded 500 box cars as a part of the 4500 cars of miscellaneous types for which the government recently inquired and which are to be shipped to France. The oil trade expects to have the best year in its history in 1918 and in such an event heavy tonnages of skelp will be required for rolling into pipe, mostly of 8-inch size. Small mills are making limited offerings of plates but no large tonnages are available. Car builders report that they are able to obtain sufficient tonnages of plates but have difficulty in making outgoing shipments. Most plate mills in this district are operating heavily, although production has been curtailed somewhat during the period of the recent severe weather.

Ship Tonnage Heavy

Chicago, Feb. 12.—Heavy tonnages of ship material, about 60 per cent of which is plates, continue to be apportioned by the government. One representative tonnage recently awarded involved 20,000 tons for use by Pacific coast shipyards. This is plain material for the builders to fabricate. There also is considerable tonnage in small lots of material for fabricating shops which are filling orders for the Emergency Fleet corporation. The aggregate of this sort of business is large though made up of many small orders. Private buyers of plates continue to seek tonnages but have little opportunity to place their business as the earliest delivery on the part of some makers is third quarter, while others could look for second quarter, contingent on the demands of the government. In any case delivery is uncertain and prompt material is not available.

Jobbers Are Short

Boston, Feb. 11.—Local jobbers report a big demand, but only a moderate turnover, owing to their inability to get sufficient supplies. With the steel mills, especially in the Pittsburgh district, badly hampered in their operations by the lack of coal, not to mention the crippled transportation facilities, local jobbers are not getting very generous receipts and actually are short of not a few lines, among which are beams, angles and channels. Building operations still are on a moderate scale and the best local demand comes from those plants working directly or on subcontracts for the government.

Quick Relief

Needed by Tin Plate Mills to Prevent Further Curtailment

Pittsburgh, Feb. 12.—Nothing has been done during the past week by the government to give further relief to the tin plate industry in order to enable it to increase operations and shipments. Unless help is forthcoming at once in the way of priority movements the output, which does not exceed 50 per cent of capacity, will have to be further curtailed. The stock in all tin mills is in excess of 3,000,000 boxes which are stored awaiting shipment to apply on orders which are urgently needed for the condensed milk and salmon trade. Some relief was obtained by the placing of cars at the disposal of plants along the river which have been threatened by floods but the car capacity was not so great as had been expected. It seems apparent the food conservation program will suffer unless the traffic is so arranged that the tin plate can be moved much more freely than at present. Mills are also in need of greater supplies of sheet bars.

Seller May Cancel

Southern makers of pig iron in inserting in contracts a clause covering price revision on deliveries subsequent to March 31, have provided for cancellation at their option if the maximum legal price fixed at any time is not satisfactory to them. This clause, as adopted by the Woodward Iron Co. for its contracts is as follows:

"Above price is subject to change in government schedule, it being agreed that the price per ton on each delivery shall be the maximum price at time of delivery authorized or fixed by the United States government, or agency of government, buyer to pay any advance or receive benefit of any decrease in price on each delivery; provided, however, that the seller, at its option, may terminate this contract as to all, or any part of unshipped tonnage if maximum legal price fixed or allowed is not satisfactory to seller."

Great Loss

In Steel Output Prolonged by January's Operating Conditions

The decided falling off in production of steel which was noted in December, continued to an even greater extent in January. Lack of fuel, poor transportation facilities and unfavorable weather caused a sharp curtailment in the production of ingots and reduced the total output of that month to a low mark. The figures of the American Iron and Steel institute show that 2,203,845 tons of steel ingots were made in January, a loss of 529,877 tons compared with December with a total of 2,733,722 tons and 962,412 tons less than the November total of 3,166,257 tons. These figures are compiled from reports received from 29 companies, which in 1916 produced 88.14 per cent of the total steel ingot output. The January figure was 895,099 tons below the average monthly production for the year 1917.

Considered on a daily average basis, the loss in production for January, compared with December, was 17,093 tons. The 29 companies reporting produced on an average of 71,092 tons daily in January, and 88,185 tons daily in December. In comparison with November, the loss was 34,451 tons, the daily average for that month being 105,542 tons.

Production of steel ingots in gross tons by grades, as reported by the institute, is shown in the following table:

Months	Open hearth	Bessemer	All other	Total
June, 1917	2,265,772	809,552	8,605	3,083,929
July	2,152,479	777,171	9,465	2,939,115
August	2,251,013	863,873	8,331	3,123,217
September	2 195,556	770,064	6,639	2,972,259
October	2,475,754	870,494	5,687	3,351,935
November	2,384,218	772,489	9,550	3,166,257
December	2,195 832	524,084	13,806	2,733,722
Jan., 1918	1,763,356	429,588	10,901	2,203,845

Engineers to Meet

The regular monthly meeting of the Pittsburgh section of the Association of Iron and Steel Electrical Engineers will be held at the Hotel Chatam, Pittsburgh, Saturday, Feb. 16. Mr. Lindquist, of the Otis Elevator Co., will present a paper entitled "A. C. and D. C. Skip Hoists". This paper will discuss some of the methods of hoisting ore by alternating and direct current and will direct attention to points where economy and simplicity have been obtained in this field. The next regular meeting of the Philadelphia section will be held on March 1, at the Majestic hotel, Philadelphia, when J. S. Rowan, of the Rowan Controller Co., Baltimore, will present an illustrated paper on "Standardized Mill Table Controllers". The Cleveland district section will meet at the Hotel Statler, Cleveland, Feb. 23, when B. W. Gilson, Carnegie Steel Co., Youngstown, O., will deliver a paper on "Generation, Distribution and Consumption of Power". The joint technical session of the American Institute of Electrical Engineers and the Cleveland district section of the Association of Iron and Steel Electrical Engineers will be held on the evening of March 8.

Navy Takes Shell Bids

Bids on a large number of projectiles for the navy have been received by the chief of the bureau of ordnance, navy department, Washington. The Raleigh Iron Works, Raleigh, N. C., on 25,000 6-inch projectiles, bid $16.50 each; on 20,000 projectiles, $16.75 each; on 10,000 projectiles, $17.25 each; deliveries to commence in 155 days. A bid made by the Tredegar Co., Richmond, Va., covering the same items, was $14.22 each for the entire lot. The Tredegar Co. proposed to begin deliveries in 130 days.

Heads Machine Company

Eliot A. Kebler has been made president of the Fawcus Machine Co., Pittsburgh, succeeding the late Thomas Fawcus. He will also act as secretary. Mr. Kebler had been secretary and treasurer of the company. This change will necessitate his taking up his residence at Pittsburgh, but it will not affect his connections with the Matthew Addy Co., Cincinnati, with which he has been associated for practically the past 20 years. A. F. Cooke, works manager, has been made manager, a post which had also been filled by Mr. Fawcus. A. H. Newell, formerly engineer and assistant works manager, has been made works manager. George C. Shaw, of the firm of Reed, Smith, Shaw & Beal, will continue as vice president, W. C. Bates as sales agent, and F. W. Beitler as purchasing agent

Texas Stack to Go In

Repair work on the Sam Lanham furnace, Rusk, Tex., which recently was purchased by the Texas Steel Co., Beaumont, Tex., is well under way. Practically all arrangements have been made for the necessary materials and the company expects to have the stack ready for operation about April 1. It is planned to ship the pig iron produced at Rusk to Beaumont, where it will be converted into steel plates for shipbuilding for the government.

Life Chairmanship

Given J. G. Butler Jr. by Pig Iron Men—Dyer President

In recognition of his long and able service to the American pig iron industry, Joseph G. Butler Jr. was made life chairman of the American Pig Iron association at its third annual meeting held in the William Penn hotel, Pittsburgh, Feb. 7. Mr. Butler retired as president of the association and was succeeded by C. D. Dyer, Pittsburgh, vice president of the Shenango Furnace Co. Frank B. Richards, Cleveland, of M. A. Hanna & Co., was elected treasurer and John A. Penton, Cleveland, secretary. The district vice presidents are to be elected by each district. Charles L. Doyle, Pittsburgh, was continued in his present position in looking after traffic matters for members of the association.

The pig iron industry of the United States was fully represented at the meeting, some of those attending not being members of the association. A class of associate members was created and additions were made to the active list. This action was taken to mobilize the entire industry and to get at facts regarding costs, conditions of trade and tonnages available, in order that the association might co-operate more closely with the goverment during the war. The purpose in view is the strengthening of the function of the general steel committee of the American Iron and Steel institute and to insure intelligent discussion of pig iron prices with the government.

Numerous tributes were paid to Mr. Butler. Among those that made remarks were Mr. Dyer and D. T. Croxton president of the Cleveland Furnace Co. They refered to the long and devoted attention given by him to the interest of the pig iron industry, and because of this it was felt to be fitting that he should be made chairman for life of the association. The association felt it was scarcely fair to Mr. Butler that he should set aside other matters of great importance, especially under war conditions to give his time so largely to its affairs. As chairman he will continue to lend the association the benefit of his advice and experience without the arduous duty of a regular officer.

Recently 40 students, representing the major portion of the senior engineering class at Cornell university, went to Wilmington, Del., to continue their final studies in a practical way, working at their professions at the Harlan plant of the Bethlehem Shipbuilding Corp.

Large Profits

Are Netted by Youngstown Sheet & Tube Co. in 1917

At $30,554,313, net profits of the Youngstown Sheet & Tube Co., Youngstown, O., in 1917 were nearly double what they were in 1916, $16,741,502. At the company's annual meeting held on Tuesday, President James A. Campbell reported that the surplus at the end of 1917 was $55,897,274, compared with between $21,000,000 and $22,000,000 a year ago. Gross business in 1917 at $89,313,064 showed an increase over 1916 of $32,393,796, while gross profits in 1917 totaled $38,168,122.

Of the total cash assets on Dec. 31, 1917, of $20,848,100, more than half, or $14,103,100, is represented by United States government securities. Reservation of between $13,000,000 and $15,000,000 was made for income and excess profits taxes, and during the year $9,874,407 was expended for plant extensions. In order to complete the projects now under way, $7,500,000 additional will be required. President Campbell stated that at present attorneys are working out a plan to increase the common stock that the long deferred stock dividend may be paid. The company's total assets are placed at $97,078,066.

In April, the operation of a mine with a daily capacity of 6000 tons will be commenced in Greene county, Pennsylvania, where 7565 acres of coal land are owned.

Pig iron production in 1917 totaled 988,478 tons, compared with 1,032,771 tons the previous year; shipments of finished and semifinished materials, 1,006,053 tons, against 908,000 tons in 1916; steel ingot output, 1,311,179 tons, against 1,216,003 tons in 1916. By-product coke production in 1917 was 877,079 tons, while shipments of 14,880 tons of sulphate of ammonia, 7,378,810 gallons of tar, 2,340,295 gallons of benzol and 452,818 gallons of toluol were made during the year.

Augmentation of iron ore reserves to the extent of 9,000,000 tons was made during 1917, and by May of this year it is hoped 102 by-product coke ovens, making a total of 306, with a daily capacity of 4000 tons will make the company self contained on coke. The company's tandem plate mill, with a monthly capacity of 15,000 tons, will be ready to operate July 1.

Membership is Enlarged

The board of directors of the American Iron and Steel institute has increased the list of active members from 1250 to 1400, while the number of associate members has been increased from 250 to 400. This action was taken owing to the gradual increase in the waiting list to more than 200. The increase in the limited number of members leaves some margin for the present, but the demand for membership is so great that it is expected there soon will be another waiting list.

Scrap Committee

Named to Represent All Branches of Industry in Price Matters

A new sub-committee on scrap iron and steel, of which W. Vernon Phillips is chairman, has been appointed by the committee on steel and steel products of the American Iron and Steel institute. Mr. Phillips has resigned from active connection with the firm of Perry Buxton & Doane, Inc., Philadelphia and Boston in that in his official capacity with the subcommittee, he may occupy a neutral position in all matters that may come up for its consideration. The full membership of the reorganized subcommittee, which replaces the subcommittee recently resigned, follows:

Chairman: W. Vernon Phillips, 1009 Pennsylvania building, Philadelphia, Pa.

Representing scrap dealers: Charles Dreifus, Charles Dreifus Co., Pittsburgh, Pa.; Joseph Michaels, Hyman-Michaels Co., Chicago, Ill.; Eli Joseph, Joseph Joseph & Bros., New York City; C. A. Barnes, chief of the bureau of iron and steel scrap, Widener building, Philadelphia, Pa.

Representing open-hearth furnaces and blast furnaces: H. B. Spackman, Lukens Steel Co., Coatesville, Pa.; W. M. Tobias, Bethlehem Steel Co., South Bethlehem, Pa.; Charles E. McKillop, Carnegie Steel Co., Pittsburgh, Pa.

Representing iron bar manufacturers: John C. Brown, Lebanon Valley Iron & Steel Co., Lebanon, Pa.; Walter C. Ely, Highland Iron & Steel Co., Terre Haute, Ind.

Representing rail rerollers: D. C. Schonthal, West Virginia Rail Co., Huntington, W. Va.; Arthur S. Hook, Calumet Steel Co., Chicago, Ill.

Representing steel foundries and electric furnaces: Theodore E. Moritz, American Steel Foundries Co., Chicago, Ill.; Rodney Thayer, Penn Marine & Ordnance Castings Co., Philadelphia, Pa.

Representing crucible steelmakers: J. S. Pendleton, Carpenter Steel Co., Reading, Pa.

Representing gray iron and malleable foundries: Benjamin D. Fuller, Westinghouse Electric & Mfg. Co., Cleveland, O.

Small Saving

From Coalless Days Compared to Losses, Statisticians Figure

Washington, Feb. 12.—Suspension of the fuel administration's order for fuelless days is expected in time to allow all industries to operate next Monday. Continued fair weather, following release last week of eight southern states from the order of Jan. 17, has reduced coal consumption and has enabled the railroads to make better progress in clearing up congested traffic.

While the administration has not been able to compile satisfactory estimates of the amount of fuel saved through observance of the order, statisticians under Railroad Director McAdoo have estimated that in 18 principal manufacturing cities $138,285,589 worth of fuel was saved at a loss of $3,122,917,000 in manufactures and $1,221,715,000 in wages. How nearly accurate this may be, it is merely conjecture at best.

All the cities for which the estimate was made are in the section of the country north of North Carolina and Tennessee and east of the Mississippi river. It is in this region that the next release is expected. South of this district the states released last week were Alabama, Georgia, Florida, Louisiana, Mississippi, North and South Carolina, and Tennessee. All states west of the Mississippi never have been affected by the order.

While there is some doubt as to what benefit the fuelless days have had on the country generally, it is conceded that in bunkering ships at seaboard considerable progress was made in clearing some of the tidewater terminals and in rushing supplies and men to Europe. That alone is worth the sacrifice, government officials feel. Intermittent spells of bad weather offset the general benefit expected to fall to the railroads.

Foundrymen Elect

The Chicago Foundrymen's club held its annual meeting Saturday evening at the City club, a feature being an address by Frank D. Chase, industrial engineer, on efficient foundries for modern foundrymen, illustrated by stereopticon slides. R. T. Martin of the McCormick works of the International Harvester Co., was elected president; A. W. Lemme of the Chicago Bearing Metal Co., vice president, and Geo. H. Manlove of the Penton Publishing Co., secretary and treasurer. Directors for two years were elected as follows: Charles Slavin, Charles L. Larsen, C. E. McArthur and Oliver Goldsmith.

Better Output

Shown in Valley and Pittsburgh District—Much Steel Piled

Youngstown, O., Feb. 13.—Reports on iron and steel plant operations in the valley and Greater Pittsburgh districts show a decided improvement over last week. Coke plants operated at 90 per cent capacity as compared with 66 per cent reported last week; open hearths at 84 per cent compared with 59 per cent; blast furnaces at 69 per cent compared with 66 per cent; and bessemer plants at 61 per cent. These figures are based on the five-day production ending last Saturday.

Embargoes still are in effect although present reports indicate that railroads are making vast inroads in the congested yards east of this city. In spite of this, it is officially estimated that 42,900 tons of steel is piled in the yards of the various steel mills in this district. A large per cent of this accumulated material is government tonnage and mill managers realize that something must be done to move it before any embargoes are lifted.

Traffic managers in this district believe the railroads should take from the valley mills a certain number of cars daily billed for eastern points before any embargoes are lifted. Even 100 cars weekly would help, they say. Otherwise the moment the embargoes are nullified they point out there would be such a vast number of cars turned over to the rairoads that they will be completely swamped within 24 hours and will not have remedied traffic conditions. The Baltimore & Ohio railroad had such an experience last week.

To Begin New Mill

Progress is being made in carrying out the plans of the United Steel Co., which will erect a rolling mill at Everett, Wash., the first unit of which will have a capacity of from 60 to 100 tons a day. W. E. Stillinger, 405 White building, Seattle, is chairman of the board and J. Johnson at the same address is secretary. This also serves as the present address of the company. All of the technical and construction work of the plant will be under the direction of Secretary Johnson, who has been connected the past 15 years with iron and steel plants in British Columbia. All the details have been agreed upon and the first unit will be housed in a 60 x 200-foot building. This unit will include a 12-inch mill with two reheating furnaces and one electric furnace. Negotiations practically are closed for the site and it is the intention to begin construction work in about 10 days and have the mill in operation in four months. The financing will be mainly done by the citizens and financial interests of Everett. The commercial bodies of the city have guaranteed $40,000 of the stock of the concern and citizens recently subscribed $12,000 additional. Scrap iron and ore contracts have been made and ore will be obtained from both the state of Washington and British Columbia. Arrangements are being made to bring skilled men from the east and Secretary Johnson will leave at once to make final arrangements in this respect.

Acquires Mesabi Mine

The Cleveland-Cliffs Iron Co., Cleveland, has purchased the Helmer mine in the Kinney district on the Mesabi range. The property was purchased from Swallow & Hopkins, which firm has operated it since 1909, and have produced nearly 935,000 tons of ore.

Buys Steel Company

The Laclede Steel Co., St. Louis, which operates plants at Alton, Ill., and Madison, Ill., for the production of billets, bars, hoops, bands, strip steel and small shapes, has purchased the Valley Steel Co., East St. Louis, Ill.

Building New Stack

The Seaboard Steel & Manganese Co., Temple, Pa., is erecting an 11 x 18 x 80-foot skip-filled stack. To round out this new stack with the required equipment, an additional stove, 20 x 70 feet, has been built and a new blowing engine installed. The present furnace, which is producing spiegeleisen, is 18 by 80 feet.

The Non-Ferrous Metals

Copper Lead Spelter Tin

New York, Feb. 11.—The market for nonferrous metals is reflecting the increasing dislocation of the nonessential industries, due to fuel scarcity, railroad embargoes and other unfavorable conditions of this hard winter. The requirements of the government for copper, lead, spelter, aluminum and other minor metals produced in this country are supplied directly by the producers, in most cases under arrangements made between producers and the war industries board. The task of supplying the nonessential industry with lead and spelter has fallen in part to the New York metal trade, which includes dealers and brokers. Such has been the diminution of demand from the nonessentials that their task has become very light and trading is accordingly limited. They are still permitted some freedom of action in such imported metals as tin and antimony, but tin has been removed from the speculative class, while antimony is in very little demand. Consequently the metal trade is facing the hardest times it has experienced in years. Some brokers and dealers are taking on new side lines, while some of the smaller ones are going out of business.

Commandeering by the government of 500 tons of Banca tin which recently arrived on steamers from the far east set the tin trade in a furor a few weeks ago. It later has developed, however, that much of the tin which was owned by consumers and needed for essential work will be released, while that owned by importers and dealers will be held subject to requisition. The owners of the tin do not know what payment will be provided for such tin as is held. Spot supplies of all grades of tin continue extremely scarce and command almost any price the holders care to ask. From now on the requirements of American consumers will be filled from the far east, Straits being bought in Singapore, Banca in Batavia and Chinese 99 per cent in Hong Kong. As deliveries from those primary sources to New York take at least 90 days, it may be several months until American consumers experience real relief from the tin famine.

The copper situation changes little from week to week, distribution going forward smoothly at the fixed prices of 23.50c for carloads and 24.67½c for less than carloads. Some anxiety was expressed during the recent traffic congestion lest refinery production suffer through inability to get through shipments of matte and blister copper from smelters in the west but some special copper trains have been arranged for by the railroads and with the moderation in the weather this anxiety has been dispelled.

The government, which seems to be about the only noteworthy buyer of lead at present, secured its January requirements of lead at 6.684c, St. Louis, which was the average price of all sales for the month as quoted in the *Engineering and Mining Journal*. Spot lead in the east continues quoted about 7c, New York, while prompt and February shipment from the west is quoted about 6.85c to 6.90c, New York.

Practically no new business is being reported at present in the market for prime western spelter. Prices are unchanged at 7.75c, St. Louis, for prompt, February and March shipment. Higher grades are in somewhat better demand, high grade spelter being in a particularly strong position as the result of heavy government requisitions. No official announcement has yet been made as to new fixed prices for spelter or sheet zinc.

The antimony market is dull and unchanged at 13.75c duty paid, New York, for spot metal.

Waste Prevention in Power Plants

Installation of Recording Instruments and Economizers Essential to Efficiency—Advantages Gained by Using Treated Feed Water—Preheating of Furnace Air is Advocated—Co-operation a Prime Requisite

BY VICTOR J. AZBE

EFFICIENCY in an up-to-date power plant is a matter subjected to daily investigations. Improvements are possible in thousands of plants that supply power for small factories, office buildings, and various institutions, since these are by far the most prevalent and also the most uneconomical. While conditions are much better than they were years ago, there is still an enormous quantity of fuel wasted, and this waste is increasing as more power plants come into existence. Reduction of this waste of national wealth is imperative. The coal resources are not inexhaustible (diminution in the supply of anthracite coal is being felt now), and even if they were, it still is the duty of the mechanical-engineering profession to conserve the financial power of the commercial public, for use in the betterment of humanity.

There are unlimited possibilities abroad for American-made goods; but to compete with foreign manufacturers we must make and sell our goods as cheaply as they do. One of the elements in the final cost of an article is the cost of power and fuel, which, ordinarily, is quite a large percentage, and a difference in its magnitude of 30 per cent plus or minus might mean the loss or profit of the manufacturer.

In 1915, about 600,000,000 tons of coal were mined in the United States, and the output is steadily increasing. Suppose the average cost of coal delivered at the power plant is $1.80 per ton, then the total cost will be $1,080,000,000. Conditions as shown in Fig. 1 exist in the ordinary power plant. The shaded areas, excluding the one marked "Indicated Energy", represent the preventable losses, aggregating about 30 per cent. This makes our total expenditure for coal about $324,000,000 each year, to say nothing of the natural gas and crude oil produced, burned and wasted, without the cost of handling and firing, and investment in unnecessary boilers, machinery and labor. If everything could be computed, the total loss would exceed half a billion dollars. This is probably due to man's inefficiency, which includes the lack of foresight and business ability, improper design and management, and inefficient operation.

Often when a power-plant installation is planned, the owner fails to consult a competent designing engineer; ill advice from incompetent persons, prejudice and fear of investing needless money do the rest. The owner is not an engineer and cannot be expected to know where a greater initial expenditure for more economical power-generating equipment will pay. Therefore, every power-plant owner should have a consulting engineer proficient in economical power-plant design and operation, and every such consulting engineer should have a staff capable of examining power plants in regard to their proper upkeep and operation and of instructing the operating force thereupon. The time spent by such specialists in a plant will depend upon the condition and size of the plant, but every plant should be examined at regular intervals, and the cost of such examinations will be amply rewarded by the savings to greater efficiency.

Average Cost of Economizer Installation

Boiler horsepower developed	Cost in dollars Economizer surface per horsepower 3 sq. ft.	5 sq. ft.
250	1,100	1,800
500	1,800	2,850
700	2,300	3,600
1,000	3,000	4,500
1,500	4,500	6,600
2,000	6,000	8,600
4,000	11,500	16,800
6,000	17,000	25,000
10,000	26,700	42,000

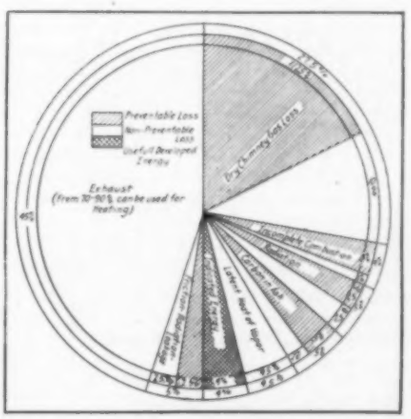


FIG. 1—AVERAGE DISTRIBUTION OF HEAT LOSSES IN NONCONDENSING POWER PLANTS

The investor, ordinarily, knows little about power-plant economics, and when contemplating purchasing new apparatus may not consult an impartial, competent engineer, but deal directly with the manufacturer, who, however honest, cannot give unbiased recommendations. Often the plant operator has the first word, and although thoroughly knowing the old plant, ordinarily is not competent, from lack of experience, to make large changes and design new plants. Therefore, owners are as much in need of education in power-plant economics as their employes.

It is pointed out that by a more efficient operation, a reduction from 10 to 30 per cent in fuel consumption is possible; the installation of proper equipment will give about three times the amount of power from the same amount of fuel; the proper investments made in the power plant will bring from 10 to 100 per cent interest; and that to obtain the foregoing results, specialists on economical power-plant operation and design should be consulted.

Next in importance is the proper planning and designing of power plants. There are large and small power plants in operation today that are monuments of folly and are wasting enormous amounts of money, chiefly due to lack of foresight when designing the plant. No important change should be made in any power plant and no new power plant should be built without advice from a consulting engineer.

Instruments to show whether a plant is operated efficiently are generally wanting. In boiler rooms from 10 to 20 per cent of the fuel, and more in some of them, is wasted chiefly from lack of indicating devices to detect losses. Every boiler should have a draft gage and, if possible, a steam-flow meter. No boiler room should be without some form of gas-analysis instrument and flue-gas thermometer or pyrometer. Too much guessing is done in the average power plant, which is, in part, responsible for the miserable results obtained. Few plants pay particular attention to obtaining economic combustion; many

From a paper presented at the New York meeting of the American Society of Mechanical Engineers.

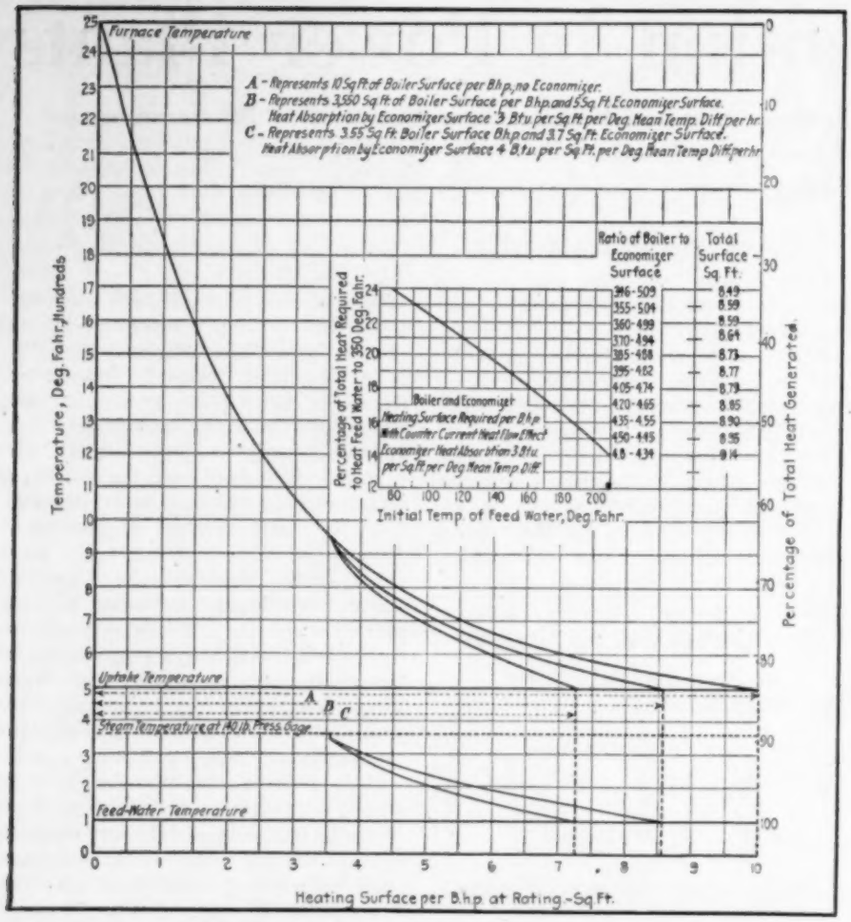

Furnace Temperature
A - Represents 10 Sq Ft of Boiler Surface per Bhp, no Economizer.
B - Represents 3.550 Sq ft of Boiler Surface per Bhp and 5 Sq Ft Economizer Surface.
Heat Absorption by Economizer Surface 3 Btu per Sq Ft per Deg Mean Temp Diff per hr.
C - Represents 3.55 Sq Ft Boiler Surface Bhp and 3.7 Sq Ft Economizer Surface.
Heat Absorption by Economizer Surface 4 B.t.u per Sq Ft per Deg Mean Temp Diff per hr
Ratio of Boiler to Economizer Surface
Total Surface Sq Ft.
Boiler and Economizer Heating Surface Required per B.h.p with Counter Current Heat Flow Effect
Economizer Heat Absorption 3 B.t.u per Sq Ft per Deg Mean Temp Diff
Percentage of Total Heat Required to Heat Feed Water to 350 Deg. Fahr.
Initial Temp. of Feed Water, Deg Fahr.
Temperature, Deg. Fahr. Hundreds
Percentage of Total Heat Generated
Uptake Temperature
Steam Temperature at 40 lb Press Gage
Feed-Water Temperature
Heating Surface per B.h.p at Rating - Sq Ft.

FIG. 2—EFFECT OF ESTABLISHING COUNTER-CURRENT HEAT FLOW ADDING ECONOMIZER SURFACE

operators have no idea what high CO_2, low CO, and other such expressions mean. Hence it is not surprising that there are boilers operated nowadays at only 40 per cent efficiency.

An automatic CO_2 recorder has a great moral effect upon the fireman, and numerous boiler plants can thank this apparatus for a large saving in fuel consumption. While it is of great value in any boiler plant, plants having a variable load with hand-fired boilers, and those having chain grates, Murphy and Roney stokers, etc., especially need this apparatus, since in them CO_2, ordinarily, is found the lowest.

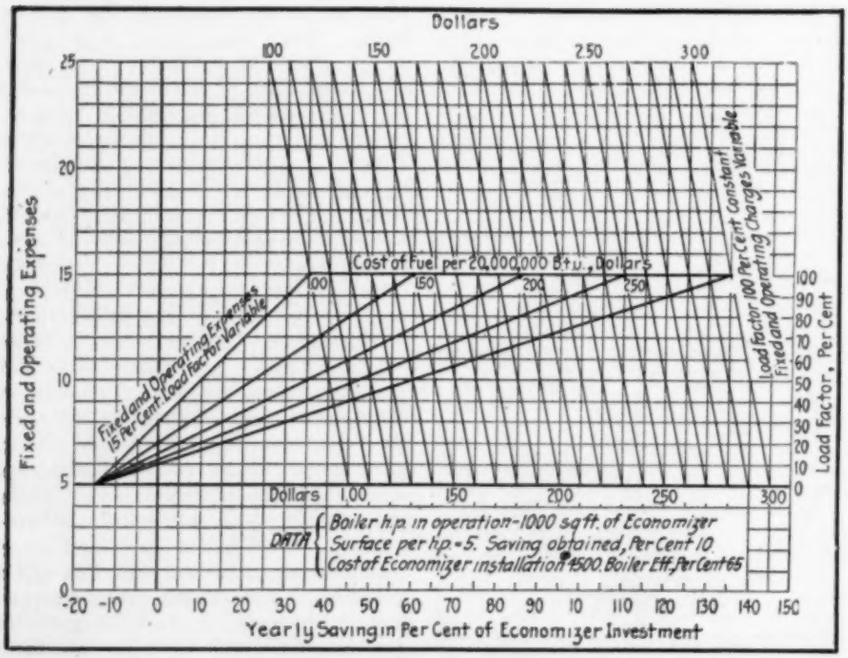

Dollars
Fixed and Operating Expenses
Cost of Fuel per 20,000,000 B.t.u., Dollars
Fixed and Operating Expenses 15 Per Cent Load Factor Variable
Load Factor 100 Per Cent Constant Fixed and Operating Charges Variable
Load Factor, Per Cent
DATA
Boiler h.p. in operation - 1000 sq ft. of Economizer Surface per hp = 5. Saving obtained, Per Cent 10. Cost of Economizer installation 1500. Boiler Eff. Per Cent 65
Yearly Saving in Per Cent of Economizer Investment

FIG. 3—EFFECT OF EXPENSES AND LOAD FACTOR UPON SAVINGS OBTAINED FROM ECONOMIZERS

The steam-flow meter on each boiler in connection with proper interpretation of the pressure drops through boiler gas passages, is also of great value and, with intelligent, trained men in charge, even preferred to the CO_2 recorder.

The common differential draft gage is also important, for, when properly connected, it will tell whether the boiler is being operated below or above rating; and whether the fuel bed is too thick, or dirty, or full of air holes. But the draft readings must be intelligently interpreted, and they seldom are. Few operating engineers know the real value of the draft gage.

Flow-meters are quite important in testing reciprocating pumps for their displacement efficiency, and centrifugal pumps for decrease of efficiency from wear of internal parts. When a plant is installed, provision should be made in various steam, water, and air lines for connecting a flow-meter, and if none is put up permanently, a test-meter should be kept to check the performance of various departments or single units of power machinery and the keeping up of the output to input ratio.

Reducible Losses

The greatest and most neglected loss in the average boiler plant is from excess air. The curves, Fig. 10, show the magnitude of this loss at different CO_2 percentages and are applicable to any fuel, liquid, solid, or gas, if its available hydrogen percentage is known.

The impression prevails that coal must be burned with about 50 per cent of excess air. Some authorities claim that going beyond 10 to 12 per cent CO_2 the loss due to incomplete combustion will offset the saving affected by reducing the excess air This opinion is based upon certain types of installation only, and should not be accepted and disseminated as a general condition. Some few up-to-date plants are averaging 17 per cent CO_2 with bituminous coal, without serious losses due to incomplete combustion. The author himself obtained an analysis giving CO_2, 17.2 per cent, oxygen 1.0 per cent, CO 0.1 per cent, which appears remarkable with bituminous coal, but is easily possible if the furnace construction is right. Hence, it is ridiculous to use 200 per cent excess air, as is often done; also,

50 per cent is more than is needed, and with proper furnace design not more than 10 per cent excess air is required.

One objection to high CO_2 is the extremely high furnace temperature and consequent rapid depreciation of furnace linings. For this reason many maintain 10 per cent CO_2 as the maximum. On the boilers of the Detroit Edison Co., where CO_2 is maintained at from 15 to 17 per cent, the furnace lining shows no effect of high temperatures.

With low percentages of excess air, proper design of combustion space becomes much more important, to prevent incomplete combustion and too high furnace temperature. Exceedingly high furnace temperatures have no real advantage and several disadvantages, therefore heating surface exposed directly to the fuel bed to reduce the furnace temperature will not only cause a decrease of the slagging effect upon the firebrick, and thus increase the CO_2 possible to maintain, but will also increase the efficiency of the boiler due to the heat radiated directly to it, and will increase the boiler capacity without increasing the flue-gas temperature. With a proper furnace volume smoke will not form if provisions for gas mixing are maintained and the temperature does not drop off too low or the boiler is not forced too much.

Heat Transmission Ignored

Heat transmission in steam boilers is a matter of importance and it should be emphasized that velocity of gas, time of contact, and hydraulic mean depth are so important that they deserve thorough study under all conditions of installation. Not much is being done in this direction and quite large boiler builders ignore the matter altogether.

Flue-gas temperatures with different well-known installations at various boiler ratings are shown in Fig. 4. It shows that results obtained are varied, and that some installations obtain the same final temperature at 300 per cent of ratings as others at 100 per cent. In one case at 200 per cent of rating the temperature of the escaping gases was 285 degrees Fahr. higher than in another, and this in spite of the fact that in both cases the amount of air used to generate 10,000 B.t.u. was the same. The seriousness of this will be realized from the fact that this condition causes a loss of about 11 per cent in fuel consumption to the high-temperature plant. This is at 100 per cent overload; at higher ratings this difference will increase as indicated by the curves.

Boilers can be operated at two times the rating, and more, but not economically unless designed for it. If operated at very high ratings the loss will be too great, unless the temperature of the escaping gases be reduced in economizers. The increase of velocity will cause draft loss, but this is not so serious, for the necessity of installing mechanical draft brings other advantages.

With high ratings and high velocities the power required to produce the draft becomes of interest. Fear that so much of the steam generated will be required to produce the draft that the advantages obtained will be offset is unfounded, if the blower is designed for efficient work and driven by an efficient engine or motor.

Reduction of flue-gas temperature is possible in most boiler installations

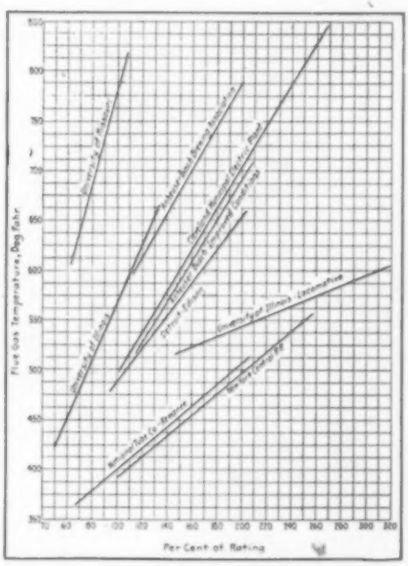


FIG. 4—FLUE-GAS TEMPERATURES AT VARIOUS PLANTS

by reducing excess air, increasing velocity, eliminating dead-gas spaces, rebaffling or installing auxiliary baffles, exposing some of the heating surface to direct radiation from the fuel bed, and last, but not least, maintaining clean heating surfaces by blowing with steam at regular intervals and scraping the heating surfaces when the boiler is down for cleaning.

Advantages of Economizers

Boiler-plant efficiency can be considerably increased by adding economizers, which are used in most European plants, but find little favor in this country. The objections ordinarily offered refer to their initial cost; reduction of available draft and, in many plants, necessity of installing mechanical-draft systems; cheap fuel (speaking comparatively); small load factors, and complication of the power-plant outlay.

The chief reason that they are not used more generally is that their value is not realized. It is difficult to reason out just what effect load variations have upon an economizer as a heat absorber. If plants were operated continuously for 10 or 12 hours and completely shut down the rest of the time, the saving would be in proportion to the load factor, but where the load remains and only varies from overload to underload, the value is difficult to determine. But since such plants are ordinarily operated uneconomically at both high and low loads, and since economizers are of greater value the lower the boiler efficiency, they are particularly needed in plants having variable loads, and the saving in fuel, if not more, will be at least proportional to the load factor. Much depends upon properly proportioning the installation, and, therefore, before an economizer is decided upon, a plant must be closely studied and the governing factors, such as flue-gas temperature, feed-water temperature, weight of air per pound of coal, load factor, character of load, etc., closely predetermined.

Economizers Affect the Ledger

That economizers are economical, not only in large, but also in small power plants, is shown in Fig. 3. It shows that the initial investment is warranted and usually will bring good returns. It was calculated upon the assumption that the fuel saving is 10 per cent; 5 square feet of economizer area were allowed per boiler horsepower, and it was assumed that the boiler efficiency, without an economizer, equalled 65 per cent. The total cost of the economizer installation was taken at $4500, which is about the actual cost except where extensive alteration must be made to accommodate it. This chart also plainly shows what effect fixed and operating charges and load factor will have upon the savings obtained from economizers.

The square feet of economizer area required per boiler horsepower to save 10 per cent in fuel with different flue-gas and feed-water temperatures is illustrated in Fig. 5. Other charts and data dealing with economizer theory and practical performance are given in Figs. 6 to 9. Installation costs quoted in the accompanying table apply to the middle-western states only.

Draft is considerably reduced by economizers, although much of the total loss is due to the gas passages leading from the boiler to the economizer and then to the stack. The drop of draft through an economizer 40 sections long will be about 0.25 inch

of water pressure if the mean gas velocity is 1500 feet per minute. other lengths of economizers the draft will vary with the length, and for other velocities as the square of the velocity. See Fig. 6. With natural draft there will be additional reduction of available draft resulting from the reduction of the stack temperature.

The loss of draft will reduce, somewhat, the amount of coal burned and consequently, the draft required. This loss, due to the economizers, is partly offset by the higher efficiency and therefore the smaller amount of coal burned and also by the ability to operate more economically the auxiliaries that previously exhausted into a feed-water heater. Maintaining high CO_2 percentage, together with having tight breeching, clean-out doors and dampers on idle boilers will tend to increase the available draft. If the stack height is so low or the boiler load so high that all the above will not insure sufficient draft at all times, mechanical draft will have to be supplied.

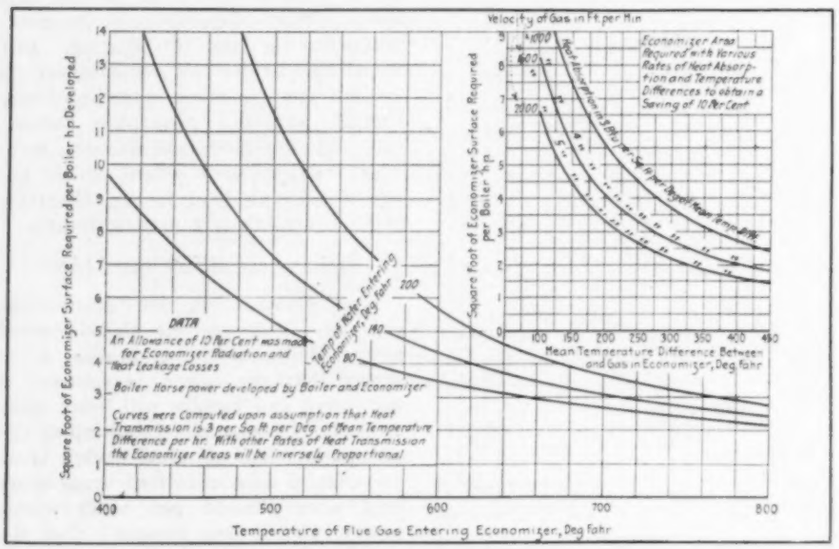

Velocity of Gas in Ft per Min
Square Foot of Economizer Surface Required per Boiler hp Developed
Square Foot of Economizer Surface Required per Boiler hp
Economizer Areas Required with Various Rates of Heat Absorption and Temperature Differences to obtain a Saving of 10 Per Cent
Heat Absorbed in B.t.u. per Sq Ft per Deg F Mean Temp Difference
Mean Temperature Difference Between Flue Gas and Water in Economizer, Deg Fahr
DATA
An Allowance of 10 Per Cent was made for Economizer Radiation and Heat Leakage Losses
Boiler Horse power developed by Boiler and Economizer
Curves were Computed upon assumption that Heat Transmission is 3 per Sq Ft per Deg of Mean Temperature Difference per hr With other Rates of Heat Transmission the Economizer Areas will be Inversely Proportional
Temp of Water Entering Economizer, Deg Fahr
Temperature of Flue Gas Entering Economizer, Deg Fahr

FIG. 5—ECONOMIZER SURFACE REQUIRED TO SAVE FUEL WITH VARIOUS FLUE-GAS AND FEED-WATER TEMPERATURES

Installing mechanical draft with the power required will in one way reduce the saving due to added interest on investment, depreciation and operating charges. These charges can be offset by the greater boiler efficiency possible with thicker fuel beds, higher CO_2, and greater rate of heat absorption attending higher velocity of the gas over the heating surface of the boiler and economizer.

Method of Cleaning

Cleaning economizers is not simple. In some plants air and steam are used for blowing off the soot with considerable success. This is effective only with loose matter; hardened soot will not be affected. Blower tubes cannot be arranged so that blowing will be equally effective throughout. If scrapers are used and give trouble by sticking, it is better to force them by hand. The sticking allows scale to form in the tubes which limits the further operation of the scrapers.

Where the natural draft is too weak to warrant a fuel economizer and conditions are such that mechanical draft cannot be considered, there is still a way to improve the working conditions. At least 40 per cent of the boiler heating surface is inefficient as a heat absorber because of the low temperature difference, and any increase in temperature difference will reduce the amount of heating surface required to cool the gases down to a given point. Fig. 2 shows the effect of establishing a greater temperature difference by reducing the boiler heating surface per nominal boiler horsepower and adding economizer surface. With a feed-water temperature of 100 degrees Fahr., the total heating surface per boiler-horsepower, without an economizer, would be 10 square feet. With an economizer absorbing 3 B.t.u. per square feet per degree of mean temperature difference per hour, the total heating surface of the boiler and economizer would have to be only 8.55 square feet. With a heat absorption of 4 B.t.u. by the economizer (see Fig. 6) the total heating surface necessary would be 7.25 square feet, or 27.5 per cent less than when water is fed directly into the boiler without preheating.

The ratio of boiler to economize surface required with different initial feed-water temperatures, and the total heating surface required in each case

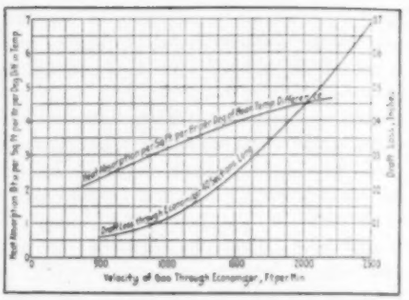

Heat Absorption Btu per Sq Ft per Hr per Deg of Mean Temp Difference
Draft Loss, Inches
Velocity of Gas Through Economizer, Ft per Min

FIG. 6 — EFFECT OF VELOCITY ON HEAT TRANSMISSION AND DRAFT LOSS IN ECONOMIZERS

is shown in Fig. 2. The saving of heating surface by establishing a greater temperature difference will become less with higher feed-water temperature. If the temperature increases up to 210 degrees Fahr., it still is possible to absorb the same amount of heat with 10 per cent less heating surface.

Draft Production

The draft loss will be less with this installation than when no economizer was attached. This will permit an increase in gas velocity over the added economizer heating surface. The installation could follow the European practice of building the economizer directly into the boiler setting, which would further reduce the draft and radiation losses. The economizers could also be of boiler steel since the temperature would never drop to a point where danger would exist from external corrosion, and to further prevent this, water entering should never be below 100 degrees Fahr.

Some engineers object to economizers because of their cast iron construction, and do not want to employ them with the high steam pressures maintained in modern plants. One way to overcome this objection would be to locate the boiler-feed pump between the economizer and the boiler. However, with this arrangement full benefit could not be obtained from the economizer, since the feed water could not be heated any higher than the evaporating temperature.

A solution for this would be to

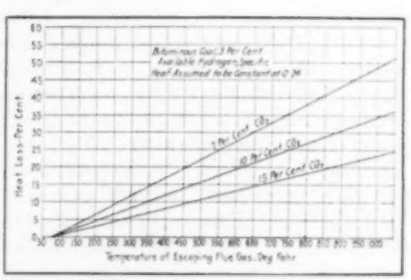


FIG. 7—HEAT LOSS IN DRY FLUE GAS WITH VARIOUS CO_2 PERCENTAGES AND DIFFERENT UPTAKE TEMPERATURES

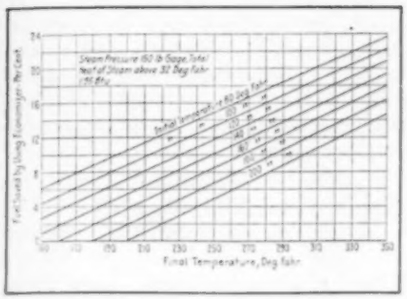


FIG. 8—SAVINGS FROM ECONOMIZERS WITH VARIOUS INITIAL AND FINAL FEED WATER TEMPERATURES

build economizers in two sections, as shown in Fig. 11. One should be built for low-temperature gases, through which water at low pressure would circulate and be heated around 210 degrees, depending upon the pressure; the other should be constructed in series with the first for high-temperature gases and full boiler pressure. The low-pressure and temperature section should be made of cast iron on account of the corrosive properties of the low-temperature gases and the high-pressure and temperature section of boiler steel as the temperature of the gases will never drop below 350 degrees Fahr. The boiler-feed pumps should be placed between these two sections. The ratio of high-temperature to low-temperature section would depend upon the initial and final flue-gas and feed-water temperature.

The internal corrosion with the above arrangement would be prevented, since the low-temperature tubes would be cast iron. By the time the water reached the steel section it would be at a temperature where it deposits inorganic matter. This precipitate would form a protective coating over the heating surface. The external corrosion would be prevented by the high-temperature water and the gas in contact with the steel section, and there would be no danger of condensing any vapor in the flue-gases. We must not forget, however,

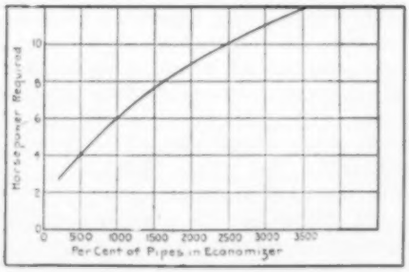


FIG. 9 — APPROXIMATE POWER REQUIRED TO DRIVE SCRAPER MOTORS FOR VARIOUS SIZES OF ECONOMIZERS

that care has to be taken to prevent the temperature in the steel section from dropping too low, or corrosion will result. But, ordinarily, the above arrangements will not be necessary, since economizers can be built of a cast-iron and semisteel composition with a safety factor of five for any boiler pressure.

Proper Feed Water

Much heat is wasted by dirty boilers, and the cost of cleaning in most plants is considerable. Using distilled water as boiler feed should be advocated whenever possible. In large plants the condensate from the condensers of the main units could be used to condense the exhaust steam from the auxiliaries, and all the make-up water obtained from a multiple-effect evaporating system, or flue-gas evaporators working under vacuum. In other plants more attention should be paid to treating the feed water.

Properly treated feed-water will not only improve the efficiency of a boiler as a heat absorber, reduce the cost of boiler cleaning and its repairs and increase its life, but will greatly increase its safety, since most boiler explosions and accidents can be traced to unsuitable boiler feed-water.

Co-operation With City Authorities

City boiler-inspection departments, with the aid of water departments could be of great aid to the operating engineers in the particular cities by keeping them informed as to what treatment the water requires to make it suitable for boiler feed. Much good could also be done by the boiler-insurance companies, not only to the engineers and power-plant owners, but also to themselves, if they had chemists to inspect samples of feed water and advise proper treatment.

Preheating of furnace air with the heat in the escaping flue-gases would effect a saving of at least 5 per cent. Air preheaters could be constructed cheaply. They should be located outside the boiler room on account of their bulkiness. They would consist of a long sheet-iron compartment through which the air and flue gas would pass, as shown in Fig. 12. The cost of installing would be low provided no extensive building alterations were required. However, mechanical draft would be necessary since there would be not only more friction of the flue-gas and less stack draft because of lower temperature, but also more power required to force the air into the furnace. These heat abstractors could be easily cleaned

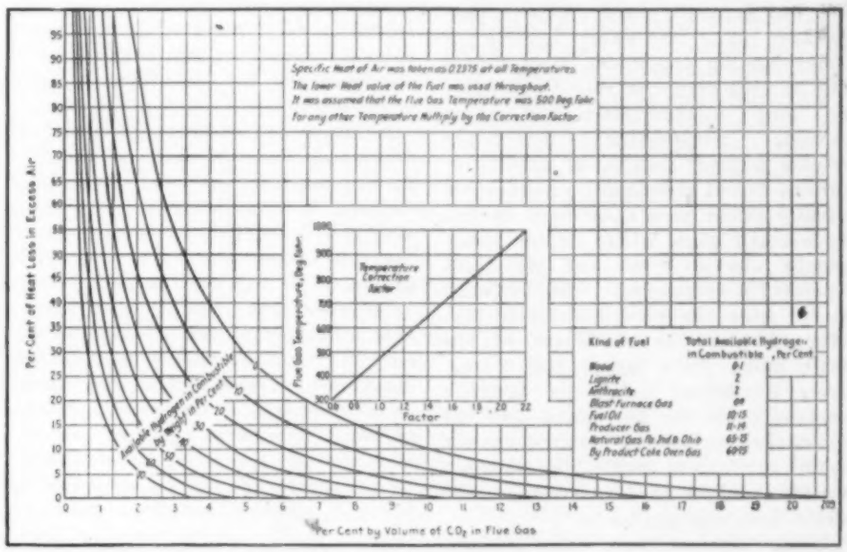

Per Cent of Heat Loss in Excess Air
Per Cent by Volume of CO2 in Flue Gas
Temperature Correction Factor
Flue Gas Temperature, Deg Fahr
Factor
Kind of Fuel
Total Available Hydrogen in Combustible, Per Cent
Wood 6-7
Lignite 7
Anthracite 2
Blast Furnace Gas 6-8
Fuel Oil 10-13
Producer Gas 11-14
Natural Gas Pa Ind & Ohio 65-13
By Product Coke Oven Gas 60-13

FIG. 10—HEAT LOSSES FROM EXCESS AIR WITH FUELS OF DIFFERENT HYDROGEN CONTENT

The air in summer could be taken from the boiler room and thus maintain the ventilation necessary in keeping the temperature down. In winter it could be taken from outside, thus insuring a comfortably warm boiler room and reducing somewhat the loss by radiation from the boilers and steam piping.

In larger central stations the use of air from the turbo-generators, as practiced by the Detroit Edison Co., is commendable. It not only saves heat, which, in this case, is small, but it cools the engine room and increases the comfort and efficiency of the men.

In many power plants, especially the larger ones, considerable attention is paid to the main power-generating units, while the auxiliaries are ordinarily neglected. Economical prime movers have auxiliaries that are so

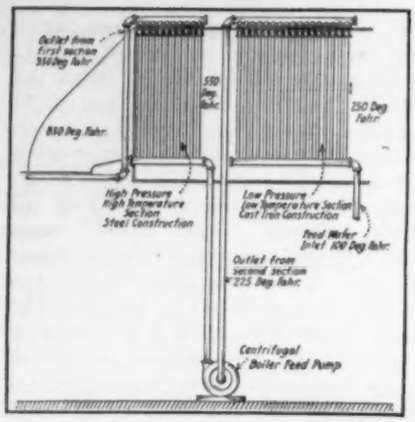

Outlet from first section 340 Deg. Fahr.
550 Deg. Fahr.
250 Deg. Fahr.
850 Deg. Fahr.
High Pressure High Temperature Section Steel Construction
Low Pressure Low Temperature Section Cast Iron Construction
Feed Water Inlet 100 Deg. Fahr.
Outlet from second section 225 Deg. Fahr.
Centrifugal Boiler Feed Pump

FIG. 11—DIAGRAM OF A TWO-SECTION ECONOMIZER

uneconomical that the efficiency of the whole plant is greatly reduced. Throttling steam pumps, especially direct-acting double and single pumps, are too generally used. Unless they exhaust into feed-water heaters or other heating appliances, they should not be used except in very small units, or only intermittently for short periods. Substituting motor-driven triplex plunger pumps, or motor- or turbine-driven centrifugal pumps would usually result in a substantial saving. In a small plant where duplex steam pumps are preferred and the plant operates condensing, the exhaust steam from the pumps could be discharged into the condenser of the main units. In a large plant, a separate condenser could be installed especially for the auxiliaries, and the discharged circulating water from the main condensers, with the make-up water, could be used to condense the steam from the auxiliaries.

Using exhaust steam from reciprocating steam pumps in the low-pressure stages of a steam turbine designed for this purpose is also quite a saving. There are many other such means that would effect large or small savings of power, but the operatives must be trained to reason and discover the ways and means to accomplish these savings.

The use of high-pressure steam for manufacturing and heating purposes should be discouraged; while sometimes its use is warranted, generally the use of low-pressure steam will effect a saving if the pressure is reduced through small turbines, engines, or pumps, since the mechanical energy will be extracted between the high- and low-pressure limits without materially reducing the heating qualities of the steam. Using large reducing valves to reduce steam pressure, while not a waste of heat, is a distinct waste of power.

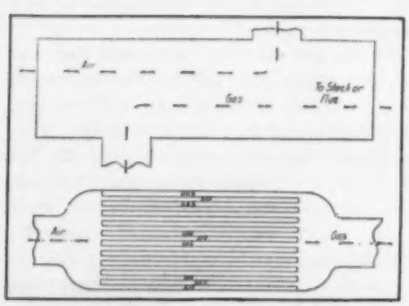


FIG. 12—DESIGN FOR FURNACE-AIR PREHEATER

Utilizing Exhaust Steam

The value of exhaust steam for heating should be more generally practiced. Even plants operating condensers could bleed the low-pressure receiver of a compound engine or the low-pressure stages of steam turbines and distribute this steam through the buildings. In power plants, where economizers are not employed and the temperature of the water is low when fed into the boilers, this partly expanded steam from the receivers could also be used to advantage in feed-water heaters.

In plants where large quantities of low-pressure steam are required and the pressure cannot be expansively reduced in a cylinder or turbine, a saving still could be made by generating this steam in a boiler under low pressure. It has been experimentally determined that there is about 6 per cent difference in boiler efficiency between generating steam at near atmospheric pressure and at 350 degrees Fahr. Because of the increased temperature difference between the furnace gas and the boiler water, greater heat absorption and consequently lower flue-gas temperatures result.

Economical Prime Movers

The uniflow engine is important to the economical operation of the smaller power plants, and has the advantages of simplicity of valve gear and reduced friction, large overload capacity, flat steam-consumption curve through various rating, reduced piston leakage and no exhaust valve leakage, poppet valves permitting use of very high superheat without complications, remarkably low steam consumption because of great reduction of cylinder condensation and re-evaporation, consequent to the foregoing smaller investment in boilers, stokers, chimneys, etc. The cost of uniflow engines is not excessive, ranging from $14 per indicated horsepower in 320-horsepower units to $16 in 190-horsepower sizes, unerected and without foundations.

The locomobile also deserves honorable mention and for most small plants is ideal. Its concentration and high efficiency are remarkable and with it a small power plant can produce one indicated horsepower hour on 1½ pounds of coal and thus be equal in efficiency to some of the largest power plants. Exhaust-steam turbines operating under proper conditions have demonstrated their benefits and should be used more generally.

Superheated steam also should be taken advantage of more than it is. In many plants substantial savings could be made by installing superheaters. Some that now have them pay little or no attention to whether the proper amount of superheat is obtained, and others have them almost cut out of service, ordinarily because of fancied objections. Frequently,

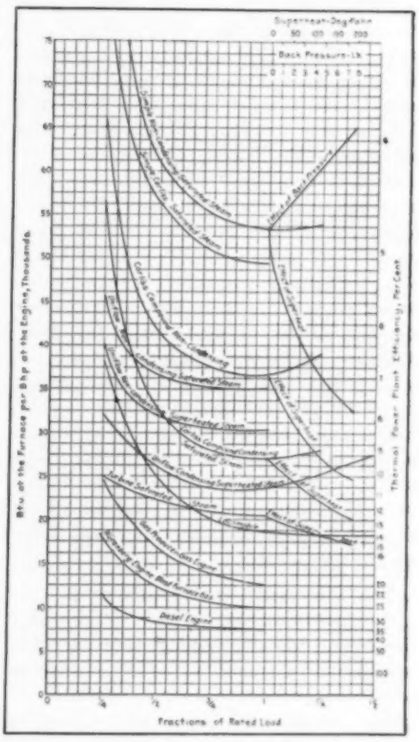


FIG. 13—RELATIVE EFFICIENCY AND HEAT CONSUMPTION OF VARIOUS POWER INSTALLATIONS

only enough superheat is obtained for the steam to reach the engine cylinder barely saturated, and thus little or no return on the superheater investment is obtained.

There are difficulties in operating corliss engines with superheated steam. Obstacles encountered should be overcome instead of condemning superheated steam without further investigation and trials. A change to a better grade of cylinder oil sometimes will settle the whole difficulty. If, after thorough inspection, the trouble is not eliminated, the highest possible superheat to maintain without difficulties should be determined and applied.

Producer-gas plants, gas engines, and diesel engines should find a much greater application. With proper care,

gas and oil engines today are entirely dependable and much more efficient than steam engines. The advisability of their use depends upon the price of the fuel, but the burning of oil and gas under boilers should be discouraged, since they are much more economically used in gas and heavy-oil engines. The gas producer's chief economic advantage is that it can use low-grade fuels unsuitable under steam boilers. The quantities of fuel wasted at the mines could be used in gas producers that supply gas to combustion engines.

The economical power plant is necessarily complicated. A higher learned class of men are required for gas and oil engines than for gas producers, and therefore we must begin to develop men thoroughly fitted to operate the up-to-date power plant. One-sided development such as inventing more efficient machinery should be balanced by educating the men to properly handle it.

Efficiency and Heat Consumption

The relative value of various power installations from a thermal standpoint are pointed out in Fig. 13. Effort was made to have the given values represent the average conditions, and while better results can be obtained (and also worse), the ones given will be ordinarily found.

All sizes of prime mover varied from 300 to 400 boiler-horsepower except the simple noncondensing engine and the locomobile which were 150 boiler-horsepower; the turbine, 4000 kilowatt, and the Nurenberg gas engine, 1200 boiler-horsepower.

Boiler efficiency in each case was assumed to be 70 per cent; an allowance of 3 per cent was made for the boiler feed pump, and 2 per cent for leakage and condensation. For the condensing engines the auxiliary steam consumption was assumed to be 5 per cent of the total steam consumption. The temperature of the feed water entering the boiler was assumed to be 200 degrees Fahr., to which point it was heated by either exhaust steam or an economizer.

The superheat for the uniflow engine when operating noncondensing with superheated steam was 120 degrees Fahr., and when operating condensing, 100 degrees Fahr., with 25½ inches of vacuum. The turbine tests represent a 4000-kilowatt horizontal turbine operating under 28 inches of vacuum, 175 pounds steam pressure and saturated steam. The effect of superheat is shown by the extension of the curve at full load. The locomobile curve represents tests made on a 150-boiler-horsepower locomobile with a varying high-pressure superheat of 80 degrees Fahr. at one-fourth load to 235 degrees Fahr., at one and one-fourth load, and ordinary intermediate superheat. Since the chart was drawn upon the assumption that the boiler and grate efficiency is 70 per cent, for any other efficiency the value will be:

$$\frac{\text{B.t.u.} \times 0.70}{\text{Boiler Efficiency}} = \text{Actual B.t.u.}$$

Smoke Prevention

There has been considerable agitation against smoke emission, and in all important cities smoke-prevention departments have been formed and laws made against smoke emission. The objections to smoke, as stated, are "public nuisance" and "fuel loss". The methods employed by smoke departments are effective in preventing the first, but the value of some of them as to the second is very doubtful. It is well known that the chief loss in a boiler plant is due to excess of air (low CO_2) and not due to incomplete combustion, of which the result might be smoke.

To prevent smoke effectively, it is necessary to center attention on the quantity of air used to burn the coal and keeping it down to a minimum, proper furnace temperature and possibilities for well mixing the combustible gases and the air. At present (with exceptions) most attention is paid to smoke and smoke alone, without paying the attention to excess-air loss that it deserves. As a result, many plants are wasting more fuel since operating smokelessly than before, because of using more excess air.

Exceedingly few firemen, not even 3 per cent, know the simplest rudiments of combustion. Many who are considered good firemen persist in operating their furnaces so that at least 20 per cent of the fuel is wasted; at the same time claiming that it is the better and proper way. To overcome such conditions they must be educated.

Literature is Helpful

It would be a great help if more of the simplest literature could be obtained, describing the economical process of firing, and this written in an interesting way. It is not meant that there is no such literature, for an immense amount of good has been done by journals, but the man who needs it most does not get it, and it would pay to bring it to him.

The United States bureau of mines would increase its usefulness by including in its excellent editions on fuel technology from time to time, bulletins of a thoroughly practical nature especially adapted to the average boiler-room man. These bulletins should be written by men who know the fireman and who have been through the mill themselves. After such bulletins are ready they should not be kept until those who need them write for them, but they should be given a forced circulation with the aid of boiler-insurance companies, smoke-inspection departments, business men's leagues, etc.

In larger power plants, reading rooms for men waiting for the change in their shift, with some good literature, will cause the men to come an hour or more before work time. Also good engineering literature should be kept on file for employes to take home. Meetings should be arranged between employes and foremen at regular intervals for discussion and instruction upon the special problems coming up, new work, and better and more efficient operation. Lectures upon different subjects pertaining to efficient power-plant operation should be given, and the men kept in close touch with not only the outside but also the inside details of their work. As a result they will be more interested in their work, eager for learning and, in general, better men, by whom the power plant will be operated much more economically.

Issuing Instructions

In smaller plants, typewritten instructions and discussions should be edited at regular intervals and given to the men to be studied. The proper amount of work and the most economical way of getting the results for each man should be predetermined. He should then be given his instructions, and it should be seen that he carries them out. Absolute strictness and discipline should be maintained, and, at the same time, if the men do the proper amount of work, in the proper way, they should receive the right compensation for it. Good men will seldom work for low wages.

A good power-plant manager should have the welfare of his employes at heart, yet usually not even proper washing facilities are provided and the men are allowed to live under unhealthy conditions, with the result that they are not vigorous enough to give efficient service. Proper treatment of men and just compensation for service rendered by them is necessary, and of much greater importance than ordinarily realized. Blindness on the part of the employers to the fact that workingmen must be treated as human beings has done an inestimable amount of harm to the industry, since organizations are springing up that directly counteract efficient performance of labor.

Competition is the best stimulus to the attainment of more and better work, and therefore should be de-

veloped wherever possible. One power plant should be compared with another. The engineers of each should be put in competition with one another whenever possible, and so also the firemen, by posting their fuel loss, obtained from average CO_2 readings, upon a blackboard in the boiler room. When practical, a bonus system should be provided and the workmen given some compensation. Better co-operation among power-plant owners and the formation of supervising engineering staffs to take care of a number of plants would be of great value, as in this way they all would obtain expert supervision that each alone, ordinarily, could not afford. Replacement of small, uneconomical power plants by large, efficient central stations will also promote conservation of the nation's coal supply.

Preventing Mine Accidents

BY HERBERT M. WILSON

THE relation of labor to the accident rate in mines is admirably epitomized by Thomas T. Read in his paper presented at the 1917 fall meeting of the American Institute of Mining Engineers in the sentence "Reliance for accident prevention must be upon the individual worker himself."

In connection with the inspection of mines for the fixing of merit premium rates for insurance under workmen's compensation, it has been the practice of the Associated Companies to allow 60 per cent of the credits for safeguarding of the physical hazards of the mine and 40 per cent for the human element. By "human element" is meant that inherent tendency of the industrial worker to be careless, negligent or disobedient, in respect to his own safety.

While the Associated Companies have accepted 40 per cent as a proportion of accidents due to the human element, a study of accident causes in the last two years for over 2000 mines has convinced me that the human element is responsible for a much larger percentage of accidents. J. S. Herbert, superintendent safety department, Cambria Steel Co., stated that 93 per cent of the accidents of that company have had no mechanical connection, and that 73 per cent of the injuries are chargeable to the man himself. Undoubtedly, one of the prime causes is industrial unrest, evidenced in the brief period during which any workman continues in the same employment or calling. In some European countries, and in some portions of the United States, where living and housing conditions, the character of the community, the treatment of the employes by their employer, and home and social conditions are satisfactory, men continue in their employment with one concern for many years. In consequence, they have a better understanding of the causes of accidents and the means of avoiding them, and the accident rate is reduced to a much lower figure.

The matter of safeguarding physical hazards can only be improved by personnel work. Mere trite aphorisms, lists of "dont's" posted on the bulletin board, pictorial bulletins and safety meets are useful in arousing an interest in the worker regarding the need of safety in his employment, but they fail to make sufficient impression on him.

There is a close relation between contentment in employment and good health on one hand, and accident prevention on the other. A contented mind gives the worker an opportunity to study his work. It is the distracted man, whose mind is elsewhere than on his work, who is the most unsafe worker. Next to him is the man in bad physical condition. The ill man does not stand firmly on his feet and is likely to stumble. He wields the pick with less vigor and precision than the well man. A strong physical body and an alert, healthy mind, are among the best safeguards against accidents.

Upsets Steel Mills' Claim Against Slag Charge

A decision handed down in Pittsburgh Jan. 31, by Judge W. H. S. Thomson, of the United States district court upholding the railroad tariffs in the slag rate case does not bring this long-drawn-out fight to an end. The iron and steel companies whose interests are involved took the case on appeal to the Supreme Court of the United States some time ago and it has not yet been passed upon. Judge Thomson's decision pertained principally to the contention made by the iron and steel companies that the tariffs should state the destination points where slag and refuse have been hauled for which service the railroads have assessed charges against the defendants. While the decision technically relates only to the case of the Baltimore & Ohio railroad against the Carnegie Steel Co., it in reality affects 28 companies. The tariff rates fix a charge of 20 cents a ton for all slag, slag dust and refuse and 35 cents a ton for ashes, mixed with brickbats, etc.

In his finding Judge Thomson said that the tariff rates had been approved by the interstate commerece commission, and it was not within the jurisdiction of his court to pass upon them. He held that the verb "to waste" meant to throw away, and that when the steel company placed slag and refuse on the dump pile to be hauled away by the railroad, it was wasted, and the latter had a right to do with it as it chose; further, that it was the defendant's duty to pay the full charges for hauling based on the regular tariff rates. A supplement to the opinion states that it makes no difference whether the destinations for the slag are omitted since the principle remains the same.

Book Review

The Canadian Mining Manual, edited by Reginald E. Hore; cloth; 448 pages, 6 x 8¾ inches; published by the Mines Publishing Co., Toronto, Can., and furnished by THE IRON TRADE REVIEW for $3 net.

Mine products necessarily form the basis for war materials. In explosives, in guns, and in shells the mines of the earth contribute their portion to the destruction of life, while all manner of protective devices have their origin in some element of the earth's crust. A survey of the mines and basic resources of Canada, covering the period which includes the first few months of 1917 is timely and valuable.

Recognizing the war needs of industry, special study is devoted to the supply of magnesite by the compilers of this manual. The magnesite obtained from Austria and Greece previous to the war is acknowledged to be superior to the North American product, but great steps have been made in overcoming the deficiency of the domestic mineral. Experiments involving the addition of iron ore and basic slag to magnesite have developed a satisfactory substitute for the imported calcined magnesite demanded for furnace linings.

Metallic magnesium which finds a wide range of war usefulness is treated in this volume. Magnesium is particularly valuable in shrapnel shells, as the explosion is shown to the gunner or observer by the white cloud of magnesium oxide by day and the dazzling light by night. Electrolytic methods of making magnesium are described in detail.

New Blast Furnace Now in Operation

Flue Dust Extracted from the Gas by a New Type Dust Catcher—Three Stoves Equipped With 4½-Inch Checkers Preheat the Blast—An All-Unit Power House is Installed

WHEN the process of preheating air before its introduction into a blast furnace was first introduced by Nielson, a large saving of fuel resulted. It was not until a number of years later that Nielson's iron pipe stove was replaced by firebrick construction. Stoves of the latter type have since passed through many stages of development both in this and other countries and even today many blast furnace managers are turning their attention to stove design in the hope of future betterment. Small checkers which increase the heating surface have been employed and with such marked success that today three large stoves will furnish all the heat necessary for efficient blast furnace practice. They are preferable to a four or five-stove layout on account of less radiation, fewer valves and gas burners, and with washed gas they can be kept in continuous service.

Furnace managers all agree that washed gas is essential to efficient blast furnace operation. It not only permits the construction of stoves with smaller checker openings but eliminates costly repairs due to the quantity of dust blown through the hot blast valves, mains and tuyeres. It offers further a better combustion of the gas in the stoves and a uniform temperature at all times for the furnace. These results could not be obtained by using dirty gas because the combustion walls and checkers would become covered with clinker which injures the brickwork and hinders its thermal conductivity and heat transfer.

Before the Whitaker-Glessner Co. built its furnace at Portsmouth, O., it considered with great care the type of gas washer and number of stoves with which the furnace should be equipped in order that maximum economy would be secured. After investigating other plants its was decided to build three stoves, 24 x 110 feet, which would contain the total amount of heating surface ordinarily found in a four-stove layout.. These are shown in Fig. 1. The shells are constructed of rolled steel plates and are built around sufficiently large combustion chambers and 4½-inch checkers. All furnace gas is delivered to the stoves in a clean and dry condition. The products of combustion are discharged through individual chimney valves into a tunnel which is connected to a brick-lined chimney, 195 feet high, near No. 3 stove. The temperature of the blast entering the furnace, the top heat, the temperature of the gases before and after washing, etc., are recorded by pyrometers housed in a building at the end of the stove platform. Each stove is equipped with a Mathesius vertical gate-type hot-blast valve and is connected to the hot-blast main which distributes the preheated air to the furnaces.

The furnace has a capacity of 550 tons per 24 hours and was erected on elevated concrete foundations by

FIG. 1—VIEW OF THE 550-TON BLAST FURNACE, SHOWING THE THREE-STOVE EQUIPMENT, DUST CATCHER, GAS WASHER AND DRIER

the William B. Pollock Co., Youngstown, O. It was blown in Aug. 27, 1917. The bosh, which is constructed at an angle of 78½ degrees, is amply strengthened by 1-inch bands. The latter are riveted on butt-straps and encircle the brickwork on the outside of the bosh from the top of the tuyere-breast to the mantle plate. The tuyere-breast brickwork is encased in a cast steel jacket, openings being provided for 12 tuyeres and the necessary cooling plates. The hearth jacket is of 1-inch rolled steel plates riveted together by butt-straps. This jacket and the hearth brickwork are protected by 1¼-inch pipes inserted between for the circulation plates which are brought up around the furnace shell to form a ventilator for the bosh gases. A dust hood riveted to the furnace shell extends over the top of this ventilator and prevents any dirt from falling through to the furnace floor or into the waste water trough on top of the manifold. The hot metal track is also provided with a roof which protects the ladles in rainy weather while waiting for or receiving the cast of iron.

Ladles Are Adequate

These ladles hold 75 tons of molten metal and are equipped with double trunnions which rest in cradles supported on two standard railroad

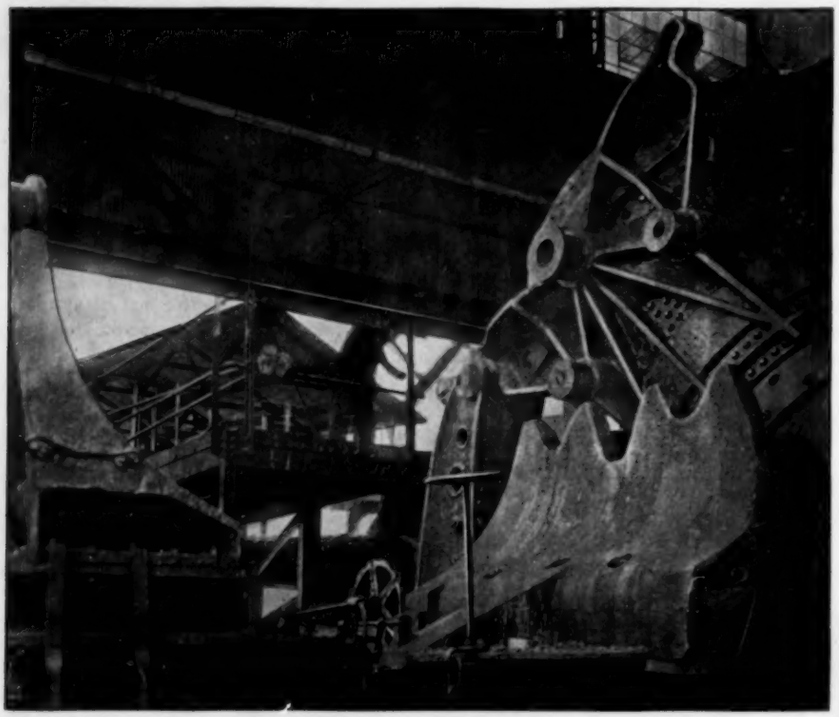


FIG. 2—VIEW OF A 75-TON HOT METAL LADLE POURING ITS IRON AT THE PIG MACHINE

of cooling water. These pipes are continuous about the entire circuit of the hearth jacket and are welded at the bottom to form a U-tube. They are connected in series of eights and discharge into funnels in plain sight of the water tender. Water for the furnace cooling equipment and for general use is supplied by a standpipe, 115 feet high, located near the cast house. Two turbine driven service pumps, each rated at 15,000,000 gallons per 24 hours transfer the water from the hot well to this standpipe.

The cast house is substantially constructed and well ventilated. The side walls nearest the furnace are brick and contain circular openings just below the roof. The building is roofed with medium-gage steel trucks. Since the steel mill department is not provided with a mixer, the iron is taken to the pig machine. If the open-hearth department needs any metal at this time, it is transferred from a 75-ton ladle to a 30-ton ladle mounted on an electrically-driven flat car and taken to the open-hearth furnaces. The remainder of the metal is cast into pigs. For this purpose a double strand, short-haul Uhling pig machine is provided. A ladle in the process of pouring is shown in Fig. 2. The pigs are cooled in transit by means of water sprays installed over each strand and are discharged into railroad cars.

Adequate space and equipment have been provided for stocking the ores. The ore yard has a capacity of 400,000 tons. This allows the ore to be spread evenly over a large pile so that the furnace receives it in a uniform condition. A general view of the yard, which is spanned by an ore bridge equipped with a 7½-ton clam-shell bucket, is shown in Fig. 3. By means of this bucket the ore is transferred from the stock pile to a 60-ton transfer car which delivers it to the various trestle bins. These bins are designed with closely spaced doors and sufficient slope to permit the ore and limestone to be easily withdrawn by the scale car operator. Two scale cars are provided. One is used to transfer the ore from the bins to two electrically-driven skips and the other is held in reserve. The skips, which are hoisted to the top of the furnace on rails clamped onto a cantilever bridge, are counterbalanced by weights. The latter operate in a steel tower placed to the left of the skip bridge, as shown in Fig. 4.

For lowering the stock into the furnace, the double bell system is used. Both bells are operated hydraulically by cylinders placed on the top platform and connected to individual hydraulic pumps which are installed in the power house. An I-beam carrying a double sheave trolley block is suspended from the top platform in a horizontal position and extends over the side of the furnace as shown in Fig. 4. The beam is strengthened by two king-post trusses fabricated from heavy angle iron. A stationary sheave at the end of the beam operates in conjunction with the trolley block when repairs to or dismantling of the top apparatus is necessary. The equipment is lowered through an opening in the cast house roof which is provided with a removable section for this purpose.

Gas is led from the furnace top through four off-takes, one of which carries a safety bleeder so designed that it gives immediate relief during heavy slips without permitting any coarse material to be thrown out. The off-takes are fitted with cast iron elbows. These are connected to four downcomer pipes fabricated from rolled steel plates. These pipes converge into two downcomer pipes. The latter enter the dust catcher. As shown in Fig. 1 new principles were employed in designing the dust catcher which is practically two dust catchers in one. A cylindrical gas chamber with cone-shaped ends is mounted on a similarly shaped vessel. As the dust-laden gases enter the upper vessel their velocity is decreased which causes a deposition of the heavier dust particles. Instead of the dust accumulating on the bottom of this receptacle, it is funneled into

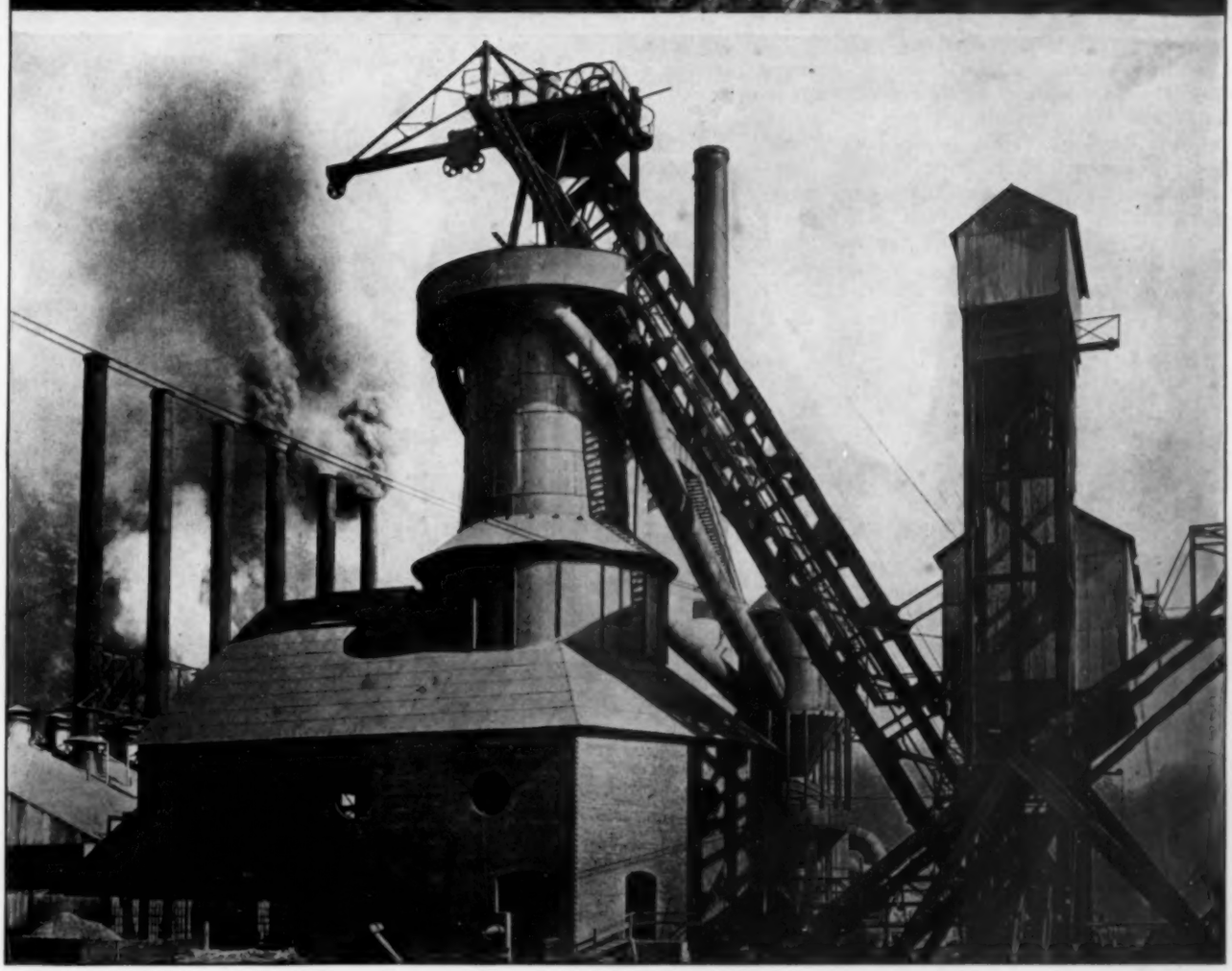


FIG. 3—GENERAL VIEW OF THE FURNACE SHOWING THE ORE BRIDGE, THE 195-FOOT STOVE CHIMNEY AND THE ALL-UNIT POWER HOUSE FIG. 4—CLOSE-UP VIEW OF THE FURNACE SHOWING THE CAST HOUSE VENTILATOR, DOWNCOMER PIPES AND SKIP COUNTERWEIGHT TOWER

the dust catcher below. This holder is emptied every 12 hours by opening a bell valve at its lower apex which permits the flue dust to flow through a spout into a hopper car below.

The gas is led out of the top of the dust catcher gas chamber and is passed into the lower part of a Brassert gas washer where a large per cent of the dust carried over from the dust catcher is eliminated. A sow drier operates in conjunction with the gas washer. The washer and drier which are supplied with water from two motor-driven pumps rated at 3,250,000 gallons each per 24 hours, may be cleaned while the furnace is in operation by by-passing the gas from the dust catcher over the gas washer and down to the boiler and stove gas main. For this purpose several goggle valves which are made of heavy boiler plate shaped similar to a figure 8 with one end of the loop open and the other closed, are installed with the open end in the gas main. Goggle No. 1 is inserted in the main connecting the dust catcher and gas washer. No. 2 is inserted between the gas washer and the cast iron pipe cross on top. No. 3 is inserted in the main connecting the washer and drier. No. 4 is inserted between the drier and the boiler main, and No. 5 is inserted in the bypass main connecting the washer and the boiler main. By turning goggles Nos. 1, 2, 3 and 4 so that the blind loop is inside the various mains, the gas from the dust catcher is directed through a bypass main connected to the cast iron cross on top of the washer and is led down to the bypass main directly over the sow drier. Platforms equipped with hand rails and toe boards are installed permanently near all goggles and are used when bolting the goggles in place.

Power Plant is Interesting

The Whitaker-Glessner Co. has adhered to present-day construction by assembling all prime movers with their auxiliaries under one roof. The building is located a short distance from the furnace as shown in Fig. 3 and is well lighted and ventilated. A brick wall extends lengthwise through the building, partitioning the boiler room from the engine room. Six 823-horsepower, vertical boilers operating at a pressure of 250 pounds per square inch and containing 630 3½-inch tubes are installed. The boilers are served by two turbine-driven centrifugal feed pumps which were installed on account of their easier operation and cheaper maintenance and not for any gain in fuel economy.

These centrifugal units, the exhaust from which contains no oil, force the lime and soda ash treated water into an open-type feed water heater located between the blowing engines and service pumps in the engine room. Each boiler is equipped with a 42-inch steam drum and a superheater which increases the temperature of the steam from 125 to 150 degrees Fahr. The superheated steam passes into the main header and is distributed through a 10-inch steam line leading into the engine room where two rotary-type turbo blowers, two motor-driven generators, two 3000-kilowatt turbine-driven generators and two 15,000,000-gallon, turbine-driven pumps are installed.

Two turbo blowers are provided for blowing the furnace. They are supplied with steam from a line independent of the generator and pump feed 10-inch line. The air delivered per minute by each blower against a pressure of 22 pounds per square inch is 44,500 cubic feet. One blower supplies the volume of blast necessary for the furnace while the other is held in reserve.

All steam-driven units operate condensing and exhaust their steam into a condenser equipped with the necessary flumes through which the cooling water is supplied and discharged. This water is taken from the Ohio river, pumped into a 40-foot standpipe by three 20,000,000-gallon, motor-driven pumps, and delivered to the condensers. This standpipe also feeds the hot well.

Who Owns Spitzbergen?

In the region of the midnight sun, a literal "no man's land" is attracting attention from several European powers both among those engaged in the war and those who are ostensibly neutral. This land, a group of islands in the Arctic ocean north of Norway is known as Spitzbergen, and it belongs to no nation, although it is under several flags according to the nation which is developing parts of the islands. The approximate areas claimed by the respective nations are as follows:

	Square miles
Great Britain	3,574
Norway	770
Sweden	448
Russia	80
Germany	23

Prominence has been given during the past two years to work being done by Norwegian companies, one of which purchased the holdings of the Arctic Coal Co., an American concern. The Arctic company in its best year is said to have secured over 60,000 tons of coal from its mines.

The coal areas of Spitzbergen are extensive, and the deposits are easily accessible. It is not necessary in many cases to sink shafts to reach the deposits. The coal comprises anthracite, bituminous and some cannel varieties that are much favored for use in Scandinavia and North Russia. Those with knowledge of the deposits state that Spitzbergen will supply all of the coal required for these regions.

In addition to the coal deposits, the British possessions have a quantity of both hematite and magnetite, as well as marble, copper ore, iron and copper pyrites, molybdenum and galena. Development of many of these deposits was halted by the war. In a recent issue, *Engineering*, London, urges action to maintain the British control and to develop British-owned minerals in the islands, stating that the owners of territory in Spitzbergen should be in position to prevent trespass. It thus seems that the control of Spitzbergen may soon become an international political question.

Reducing Waste in Shipping

How shippers can aid in avoiding the waste and destruction of more than $2,000,000 worth of freight every year is shown in a bulletin entitled "Loss and Damage", recently issued by the Pennsylvania railroad. The purpose of the bulletin is to urge shippers to pack their goods properly and to use containers that are strong enough to stand transportation. The value of freight injured in transit on the Pennsylvania railroad has doubled since the war, due, considerably, to efforts on the part of shippers to economize in the use of packing materials and to the use of weak or second hand containers.

The bulletin is illustrated with a series of photographs showing actual examples of improper packing and the collapse of weak containers. One picture shows a shipment of axes, which broke through paper boxes never intended to carry such hardware. Other pictures illustrate similar conditions encountered in shipments of denim, cotton yarn, cotton piece goods and sheeting. To overcome these unfortunate conditions manufacturers are urged to help by: Using stronger containers, packing your goods properly, crating your furniture better, marking your goods plainly and removing all old marks.

The new plant of the Hydraulic Press Mfg. Co., Mt. Gilead, O., has been completed and the works is again in full operation. The new plant has a much larger capacity than the one it replaces, which was burned some time ago.

Manchuria Coal and Iron Deposits

Large Coal and Iron Deposits Exist in the Pen-hsi-hu District—Magnetite Belt Estimated to Contain 500,000,000 Tons of Ore—Description of $7,000,000 Blast Furnace and Steel Plant

BY C. F. WANG

MANCHURIA, called the "Three Eastern Provinces" in Chinese, forms the northeastern corner of China and is bordered by Siberia on the north and northeast, and by Korea on the east. The Black Dragon river forms the boundary between China and Siberia, and the Ya-lu-kiang divides it from Korea. The region to the south and west of these two rivers is rich in forests and in mineral resources, the latter including many deposits of iron, coal, gold and various nonmetallic minerals. The great magnetite belt which will be discussed later lies approximately in the central part of South Manchuria.

Ore Deposits

Magnetite and some hematite are found abundantly at An-shan-chang, on the Dairen-Mukden line, where a new joint company has been established. Other hematite deposits have been reported south and east of An-shan-chang; these deposits are found in various beds of different origin. Deposits of semibituminous, coking, and bituminous coals have been found near Mukden, at Fen-tai, Pen-hsi-hu, Niu-shin-tai and in the southeastern part of southern Manchuria. The two most important companies are the Fushun colliery, located about 10 miles east of Mukden, now worked by Japanese interests affiliated with the South Manchuria railway, and the Pen-hsi-hu Coal & Iron Co.

Pen-hsi-hu, a community of about 13,000 inhabitants, lies about 45 miles southeast of Mukden. Two hundred years ago this district was well known for its coal and iron industry, but owing to the underground water in the coal mines it progressively declined from about 1875 till the Russo-Japanese war. There were over 2000 people working there then. The ore for the iron industry was obtained from iron deposits at Miao-er-kou, Niu-shin-tai, and Huo-lien-chai, and today the bottoms of the crucibles which were used for smelting iron by the native method, can be seen in the street employed as bricks for building walls. The South Manchuria railroad, a standard-gage line, passes through this country.

After the Russo-Japanese war, in October, 1905, Count Okura reopened the abandoned coal deposit. It was worked without Chinese permission for several years, until 1908, when the governor of Fengtien province, proposed to combine Okura's interest with Chinese capital to form a joint international company. The company, with a capital of $2,000,000 silver, began operations as the Pen-hsi-hu Coal Co. In 1911, the Miao-er-kou iron deposit was located, and in August, the incorporation of the Pen-hsi-hu Coal & Iron Co., Ltd., with a capital of $4,000,000 in silver, $2,000,000 from each party, was completed. In 1914, an increase became necessary for building the second blast furnace, and the company increased the capital to $7,000,000 approximately equal to $3,500,000 gold. At present this company has coal mines producing over 1000 tons of coal per day, limestone quarries, a coal-washing plant, a coking plant of about 300 tons daily output, a blast furnace of 150 tons capacity and an iron ore mine at Miao-er-kou producing about 300 tons a day. A second blast furnace is at the present time being erected at Pen-hsi-hu. A concentration plant is to be erected at Nan-fen, near the main line of the railway, and a briquetting plant for fine iron ore and concentrates. In the near future a coking plant will be built, and also a steel plant.

This is perhaps the first joint company between Chinese and Japanese. The organization is based on the principle of giving equal participation to both in the personnel. It is therefore to a certain extent a duplicate system, which means more or less waste both in energy and expense. However, it tends to show in a general way that so long as one nationality is not seeking too much advantage over the other, a formal co-operation can exist.

Two-thirds of the employes are Japanese, while almost all the laborers are Chinese. In comparison with either American or European companies of this kind, or even with Chinese enterprises, the wages paid the employes are low, but the standard of living and the dominant patriotic mood seem to make them available in sufficient numbers.

Coal Mining

There are three coal mines in operation at Pen-hsi-hu. A fourth was abandoned on account of excessive water. They are all worked to the dip of about 20 degrees. No. 1 pit was first started in April, 1906, on the Chou-tuan seam, which has the Pao-cha and Siang-tuan seams above it, a total of about 15 feet of coal. Three inclined shafts were simultaneously sunk for this pit for haulage, drainage and ventilation and manway. The haulage shaft has reached 2240 feet, of 6 by 10 feet cross-section; the drainage and ventilation are taken care of by one inclined shaft, reaching 2352 feet, of 6 by 10 feet cross-section; and the manway, reaching 3042 feet from the surface, is 6 by 8 feet in cross-section. There are nine levels in the pit, 268 feet apart.

The No. 2 pit was started in October, 1907, about 200 feet below the Chou-tuan seam, along the second seam, which, with the first seam constitutes about 12 feet of coal. It was shut down for a year or so, but resumed working in March, 1909. It has two main inclined shafts; namely, haulage, which is 7½ by 12 feet cross-section and 2336 feet long at present, and manway, 6½ by 8 feet cross-section, 2964 feet long.

In the No. 3 pit there are eight levels. All coal is dumped from the third to the eighth level. The three inclined

The Chinese Iron Ore Problem

HOW much iron ore is there in China? This is a question which has long been puzzling mining engineers. Apparently most of the so-called estimates of the ore reserves of that country have been merely wild speculations for results vary by hundreds of millions of tons. For this reason mining engineers, and theorists holding visions of a huge steel industry in the Orient were especially interested in the paper of Chung Yu Wang, a native mining expert, presented at the 1917 fall meeting of the American Institute of Mining Engineers in St. Louis. Mr. Wang described in detail the formation and value of the Tayeh iron ore deposits. The accompanying article, also by a Chinese mining engineer, described the deposits of the Pen-hsi-hu district in Manchuria, and brings to light the developments made by the Pen-hsi-hu Iron & Steel Co.

shafts, the haulage, drainage and ventilation, and manway have 3000 feet, 3180 feet and 2130 feet, respectively. This pit was driven in October, 1909, to facilitate transportation when the No. 1 pit's production was curtailed on account of the long distance.

The method of mining employed is both long-wall and board and pillar systems. At present the latter is more generally used, but in the case of the first and second seams, which are close together and both thick, the long-wall system has proved a failure.

Coal Washing Plant

The coal from the mine is dumped through tipples to a moving screen which separates the size above and under 50 millimeters; the oversize passes to a traveling metal belt which distributes the coal to a shaking table perpendicular to it. Men standing at both sides of the table sort out the rock and the clean coal goes to the bin, to be loaded on the outgoing train. This oversize constitutes about 19 per cent of the total coal, of which 14 per cent represents the coal proper, the rest rock and sulphur balls. About ½ per cent of this oversize coal which is crushed to fine dust on the table is sent to the fine coal bin without any further washing. The sizes up to 50 millimeters are elevated by means of bucket elevators to the top floor of the washery, from there they pass through a series of shaking screens which separates four sizes; egg, walnut, pea and fine dust.

The washing plant is worked only in the daytime. It can handle 85 tons per hour. There are 20 men in each shift, and the washing cost, not including the repairing of machinery, amounts to about 5 cents silver or 2½ cents gold per ton. The picking cost is 20 cents gold per ton. The sizes above pea are sold, while only the fine coal is used for coking purposes.

Magnetite Belt

The great magnetite belt in Fengtien province is extensive in area and the deposits are of large size. Near Liao-yang, at An-shan-chang, poor ores—from 30 to 50 per cent iron—occur mostly in the form of magnetite in layers with quartz. Near Mao-chien-hu-tun, at Wai-tou-shan, the ore is 40 to 50 per cent iron. Magnetite, dipping 45 per cent west and about 100 feet thick, lies between quartz-porphyry and gneiss. At Miaor-kou, the ore zone is 300 to 600 feet thick, including two rich veins, 50 and 33 feet thick, respectively, and 66 to 70 per cent iron. The ore lies between walls of talc-schist. Above the talc-schist is gneiss and quartzite. The tunnel intersects pure white talc-schist, chlorite schist, poor ore, and finally the rich ore. The rich ore is so far known to be about 480 feet long and 50 feet wide, narrower at the middle and ends.

On a conservative estimate, the orebody at Miaor-kou, with about 500 feet now developed, must contain over 100,000,000 tons, of which about 2,000,000 tons is 60 to 70 per cent iron ore. In a general way, the great magnetite belt probably contains over 500,000,000 tons of ore, including rich and poor, associated with talc-schist and gneiss.

Mining was first started on the outcrops of rich ore, but later three levels of 120 feet apart were driven. The open-cut mining is done during the summer time, as the excessive coldness in the winter renders such work impossible. Overhand stoping is used in the underground work. No machines or machine drills are used—all the drilling is done by hand; dynamite and nitroglycerine are used as explosives. The roof rock, which is low-grade ore here, is very hard, as is the orebody itself. No timbering is used except at the drift entrance. Massive rooms of 80 to 100 feet each way and some 60 feet high are worked without any support. Precautions are taken to blast down all ore or poor ore that is attached to certain cleavage planes. In the three years' record, only one accident has happened when a block of the roof, about 80 feet square and 5 to 6 feet thick, fell and killed 13 men. The rich ore is crystalline and is friable, 10 to 20 per cent of the mined ore being fine dust. The mining is done under three foremen each of whom has command of 250 to 400 men, working 12-hour shifts when driving drifts. At midday, when the shots are fired, the miners have two hours for luncheon. The men are paid according to the number of cars of ore mined or number of feet advanced, and the men in a gang, mining, transportation, miscellaneous carriers, etc., all receive equal pay for the total output made by the gang. The cost of explosives, food, drills, lamps, and oil is deducted at the end of each month.

As I have mentioned already, the major part of the deposit at Miaor-kou is composed of poor-grade ore, running from 30 to 55 per cent iron. As around 75 to 80 per cent of the ore is in the magnetic form, and the quantity is so large, a concentration plant for treating it is necessary. This plant is now being erected at Nan-fen, near the railroad station, and will have a capacity of 150 tons per 12 hours. The poor ore is brought in by the narrow-gage railroad on the eastern hillside to the ore-bin, from which it runs into a jaw crusher of 620 x 325 millimeters aperture. This crushes the ore to about 1.5 millimeter. From here it goes through two Grondal magnetic separators; the magnetite is picked up and separated, the tailings proceed to the classifiers to be sorted into three grades, the heads are sent to the main flow, tailings to waste and the middling pumped back to be reconcentrated on tables. The product from the first Grondal separators is reground with water, in a tube-mill having a diameter of 1.3 millimeters and length of 5 millimeters, by means of steel and gravel balls, to under 0.07 millimeter. The ground ore is allowed to run through another set of two Grondal separators, which are exactly similar to those of the first set. The concentrate from this set is sent to shaking troughs, together with the incoming heads from the tables; from there they are discharged to the railroad cars by means of an overhead crane. The unmagnetic product from the second set of the magnetic separators is pumped to the tables for further concentration.

Blast Furnace Smelting

The first blast furnace was completed in December, 1914, after one year's work of erection. The plan of the company is to build eight blast furnaces and a steel plant. A second blast furnace is approaching completion this winter. The No. 1 blast furnace was built by Pearson, Knowles & Co., of England, at a cost of $2,400,000. It is 83 feet 3 inches above ground level, with two exhaust stacks 75 feet 9 inches high, standing above the charging level. The distance between the charging level and hearth bottom is 65 feet 7 inches. The hearth diameter is 9 feet 10½ inches and 7 feet 10 7/16 inches high. The bosh is 17 feet 8½ inches diameter and height 14 feet 7 15/16 inches. The diameter of the furnace tops is 11 feet 1½ inches. The capacity of No. 1 blast furnace is 10,279.34 cubic feet. The second furnace is of similar dimensions and design.

Unusual Tuyere Arrangement

The furnace has two sets of tuyeres, one above the other. The upper set was intended for emergency use, but it was later found good practice to use both of them. The charging is done by an inclined hoist with a charging bucket of two tons capacity. It has a length of 164 feet with an inclination of 51 degrees. The dynamo is 37 horsepower. There are three hot-blast stoves for No. 1 furnace. They are of the McClure type (three pass), each 90 feet high 20 feet in diameter, furnished with a stack of 70 feet high and 6 feet 3 inches diameter. The discharge valve of the hot blast is 8 feet 8 inches (1143 millimeters) above the floor. The air is supplied by two turbo-blowers, each having a capacity of 16,000 cubic feet per minute at 4 to 7 pounds pressure per square inch at 3000 revolutions per minute. We have found that three blast stoves are quite insufficient to

keep up a constant blast temperature, especially during the severe cold of winter; as 40 degrees Cent. below zero is not uncommon during December, January and February. The blast can be adjusted with cold air to maintain an even temperature blast. The temperature used is from 600 to 650 degrees Cent., depending upon the kind of iron produced.

Prewar Wages and Hours in the Iron Trade

The bureau of labor statistics of the United States department of labor has just issued a report on the survey of wages and hours of labor made in the iron and steel industry between 1907 and 1915. This report furnishes an insight into the normal development of labor conditions, uninfluenced by the drive of war production.

Full time weekly earnings in May, 1915, were from 4 to 8 per cent higher than in May, 1907, in blast furnace, bessemer converter and bar mill plants. These increases represent an even greater increase in average earnings per hour as the average full time week decreased from 2 to 6 per cent between 1907 and 1915 in the three departments mentioned. In all lines of the industry excluding only puddling mills, the decrease in hours of work over the period from 1910 to 1915 was from 1 to 6 per cent, while the increase in wages ranged from 2 to 22 per cent. In 1916, the year following the period covered by the report, other sources show the increase in wages in these lines to have been 33 per cent.

War-driven production has not made the seven-day week. In this report, it is shown that the tendency was strong for continuous operation of many plants, including of course blast furnaces before the war. In 1907, the plants reporting showed the customary working time to be seven days a week for 97 per cent of the employes. Since 1910 there has been a material reduction in the seven-day week, as many blast furnaces made provision to lay off each employe in rotation one day in seven. Eighty-nine per cent of all the employes reported in blast furnace operation worked seven days a week in 1911; 82 per cent worked a seven-day week in 1912 and 80 per cent in 1913. In 1914 only 58 per cent were continuously employed throughout the week.

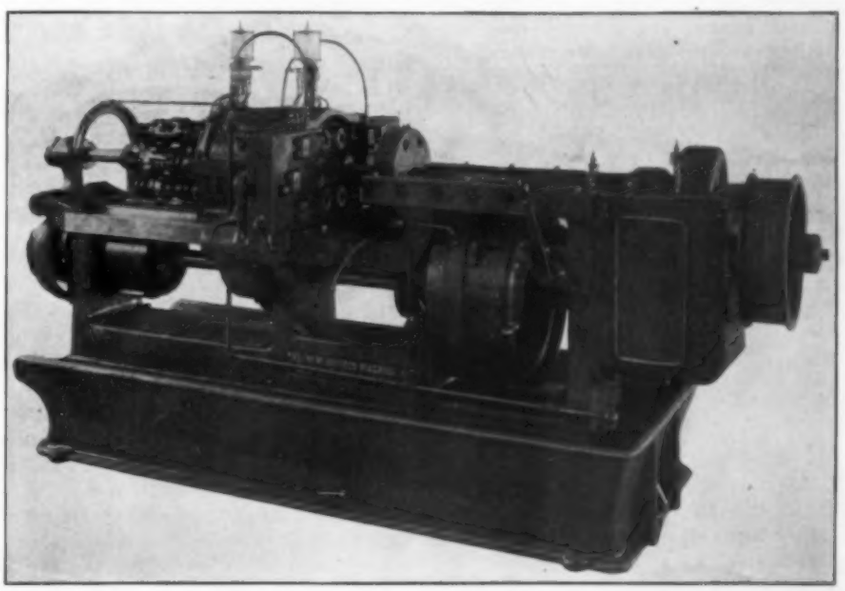
Bessemer converters and open-hearth furnaces are usually in operation day and night for six days a week, a shut down being made over Sunday for a period of from 12 to 36 hours, except when the demand is very heavy. In 1907, a year of large production, 24 per cent of the bessemer plants covered in the report, worked seven days a week. In the next two years the percentage was smaller, but in 1910, another prosperous year, 34 per cent of the employes in the same plants had seven working days a week. In 1911 the same plants showed only 11 per cent continuously employed. Throughout the nine-year period, the majority of employes in the bessemer converter plants worked six days a week, while a few alternated between seven and six days a week. The employes in open-hearth furnace departments during a six-year period covered were almost equally divided among the seven-day, seven-day and six-day alternately, and six-day groups. In all rolling mills, the per cent of employes working seven days per week was very small.

Gives Increased Output

Nonindexing Feature of Automatic Bar Machine Permits Series of Operations to be Performed in Each Position

FOR blanking rolls, sleeves and similar parts, the New Britain Machine Co., New Britain, Conn., has brought out an improved six-spindle automatic bar machine. In the new machine the spindle cylinder does not index, as the machine is designed to permit feeding, cutting, drilling, chamfering and cutting-off operations in each position. On simple work involving sleeves and the like, this feature enables an increase in the production of parts. Hand-control levers on either side may be used to start or stop the power feed. These, in connection with a hand feed crank for testing feed movements and tool positions are essential features, it is maintained, in that their use reduces the breakage of tools in setting-up, testing and adjusting. The bed, directly beneath the work, has a 45-degree slant, so that chips and pieces of stock which are cut off, are delivered at the side of the machine. The chip pan slopes over the reservoir so that oil drains from the chips before they are removed. Chips may be removed without changing the machine.

The six spindles rotate clockwise and are of heat-treated chrome-nickel steel, while the bearings are of bronze bearing metal, ground straight inside and taper outside. In order to maintain the original accuracy of the machine, provision is made for taking up the wear in the bearings without disturbing their alignment. A considerable reduction in the power required to drive the machine is obtained by fitting ball thrust collars on the spindles. The change gears provide six spindle speeds, while a separate system, which is supplied, provides for changes in feed by varying the speed of the camshaft. In order to operate the tool slide at high speeds when the tools have finished cutting, a differential motion is regularly fitted.



NEW SIX-SPINDLE AUTOMATIC BAR MACHINE

Even balance of the thrust of the work above and below the center line is aimed at by a special design which, it is asserted, overcomes any cramping or straining action. The tool slide cam is laminated similar to a leaf spring. This construction permits the adjustment of one cam to all lengths of work within the capacity of the machine. An internal gear drives the camshaft through the medium of the feed cam drum. The thrust of the tool slide against the feed cam is resisted by a hardened steel roll, fixed to the frame, and bearing against the edge of the drum.

Plans Norwegian Plant

Since the beginning of the war numerous attempts have been made to build steel mills in Norway, according to report of commercial attache Erwin W. Thompson at Copenhagen. While nothing much has been accomplished, a new company from Stavanger, it is reported, contemplates building a steel mill in Tysfjord, near Narvik that will cost $5,000,000. This will be in the immediate vicinity of large deposits of iron ore.

Talks on Electric Heat

Frank Thornton Jr., engineer, electric heating department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., read a paper entitled "Electricity as a Substitute for Natural Gas for Heating Purposes", at the annual meeting of the mechanical section of Engineers' Society of Western Pennsylvania at Pittsburgh Tuesday evening, Feb. 5. In view of the importance of obtaining substitutes for natural gas at the present time the attendance was large. Mr. Thornton's paper includes a resume of the present state of the art of industrial electric heat together with descriptions of industrial applications in successful operations. The paper also discusses the probable course of future developments and the possibilities of additional applications in various lines. The paper was illustrated by lantern slides.

Traveling Anti-Waste Exhibit

In large manufacturing plants where thousands of men and women are employed great opportunity exists for materially reducing one huge expenditure, that of waste, by instilling into the minds of employes the desire for thrift. The Westinghouse Electric & Mfg. Co., Pittsburgh, recently devised the novel scheme of actually showing to employes the wasteful tactics practiced by them. On one side of an ordinary industrial truck was piled food such as bread, butter, meats, crackers, cheese, etc., which had been discarded as the remnants of lunches. On the other side of the truck were piled company owned manufacturing materials such as copper, zinc, lead, mica, rubber, felt and gum which had been discarded as waste but which undoubtedly could have found further advantageous employment. The truck was driven slowly up and down all the aisles in the plant to enable every employe to see it.

An object lesson of this character should be especially valuable at the present time when the nation is endeav-

WHY CONSERVATION MUST BE RIGIDLY ENFORCED

oring to impress upon the minds of all of us the necessity for conservation.

It was estimated that the food wasted daily amounted to $35 to $50, the largest individual portions of which must be borne by the most prolific wasters. It was pointed out, however, that the manufacturing materials which had been lost through the thoughtlessness, carelessness or laziness of employes must be entirely borne by the company.

Tungsten in Alaska

Most of the tungsten produced in Alaska in 1917 came from the Fairbanks district and the Seward peninsula. At the present time two tungsten mines are being worked in the Fairbanks district. A 75-ton mill, in operation at one of these mines, late in the summer of 1917 was turning out several hundred pounds of scheelite concentrates daily. Underground work was in progress at both mines. Present indications give promise of a large increase in the production of tungsten in the Fairbanks district. In the Seward peninsula tungsten was produced principally by sluicing the residual scheelite-bearing lode material in Sophie gulch. Smaller quantities of tungsten were obtained in other districts by placer mining.

To Build Gas Plant

The Koppers Co., Pittsburgh, has been awarded a contract by the Providence Gas Co., for the construction at Providence, R. I., of a battery of 40 Koppers gas ovens for the manufacture of illuminating gas and of metallurgical and domestic coke. The novel feature of the installation will be the heating of the oven by means of producer gas manufactured in an outside plant of mechanically operated producers, using coal as fuel. The use of producer gas for heating the ovens will release all the coal gas made in the coke ovens for distribution in the gas system. Construction work already has been started and it is expected to commence delivering gas during the fall of 1918.

Many Furnaces Operating

The United States Steel Corp. at the beginning of the year made public an interesting list of electric furnaces either installed or in the process of installation in plants of the United States and Canada. The list, totaling in all 272 furnaces, shows the Heroult unit the leader with 146 installations and the Snyder second with 36. Graded according to number of installations the list is as follows: Heroult, 146; Snyder, 35; Gronwall-Dixon, 14; Rennerfelt, 13; Greaves-Etchells, 12; Ludlum, 6; Booth-Hall, 6; Girod, 5; Moore, 4; Induction, 3; Stassano, 1; Wile, 1; special makes, 26.

Corrosion of Muntz Metal

The bureau of standards, Washington, D. C., has issued a new publication entitled "Typical Cases of the Deterioration of Muntz Metal (60:40 Brass) by Selective Corrosion." The paper reports the study of selective corrosion of muntz metal, a material having a variety of industrial uses. The selective corrosion is illustrated by four types, including tubings, sheets, and forgings. The metal becomes red in color, very weak, and brittle by this type of corrosion. The condition favorable to such corrosion is the accelerating effect of the closely adhering deposits of chloride resulting from the attack of the metal. Other conditions accelerate the corrosion such as contact with the more electronegative constituents, increase of temperature, and service stresses.

Avert Drastic Motor Cut

Builders of Pleasure Cars Plan Orderly Readjustment and Concentration on War Essentials—Confident of Future

DISINTEGRATION of the motor car industry, as threatened by the recommendation of the fuel administration that production of passenger cars be reduced immediately 50 per cent, has been prevented by a delegation of Detroit bankers and motor manufacturers who conferred with government authorities in Washington a few days ago. The change in the attitude of those interests in the capital that, since the entrance of the United States into the war, have regarded the motor car industry as unessential to the success of American arms abroad has came from a realization that this billion dollar industry, the third largest in the country, has taken a leading part in the production of the necessities of war.

Washington's official mind has been slow to grasp the significance of the motor car industry as a war time asset second only to the steel industry in the production of manufactured finished products. This has been true in spite of the fact that it has called upon the industry to furnish not only aeroplane motors, army trucks, dispatch cars, ambulances, tractors, shells, gun carriages, limbers, gun recoil mounts, mines and mine anchors but has drawn upon the industry's best technical and administrative skill in the direction and operation of its various munitions production departments.

Motor car manufacturers do not attempt to justify the assumption that passenger motor cars are unessential to the conduct of the war, but they do insist that any arbitrary or sudden curtailment of the production of such vehicles means the disintegration and disruption of an organization that has required a score of years to upbuild and which has reached the highest plane of efficiency of any industry of its type in the world.

As a result of the recent conferences in Washington it is believed that the government now realizes that the motor industry is willing and in fact already has adjusted itself to a war basis by subordinating the production of passenger cars to government requirements. The extent to which this has been done is indicated by the fact that in Detroit alone contracts for war materials have been accepted involving the expenditure of $590,000,000.

The motor car manufacturers realize that reduced production now means increased demand after the war. The problem of converting 235 passenger car factories in the country to munitions work through a gradual reduction of motor car output has been placed in the hands of a representative committee of seven leading manufacturers who will co-operate with the automobile industries committee of the war board. Operation of motor car plants under government contracts has so far proved profitable and several plants have been enabled to greatly expand their facilities to enter the truck manufacturing business on which there are no restrictions.

As to the future of the motor car industry after the war manufacturers are not worried, realizing that in that period the United States will be the only country in the world devoting attention to the passenger car business.

Detroit is Truck Center

The motor industry, 85 per cent of which is represented in Detroit, has developed the truck manufacturing end with amazing rapidity. Some of the larger builders such as the Packard Motor Car Co., are sending trains of from 20 to 50 trucks two and three times a week to the Atlantic seaboard under their own power for overseas service.

It has been estimated that 25,000 trucks are needed at once by General Pershing's army in France. The importance of the motor truck has not been underestimated by the quartermaster's department and nothing has been done to interfere with their production in unlimited quantities. The truck has been standardized and the manufacture of parts has been divided up among various manufacturing industries. It was motor trucks that saved Verdun and the government has taken the stand that the United States army should have plenty of these vehicles for transport and other service.

The industry has suffered heavily in loss of skilled workmen through the demands of the war department. This has followed from both the operation of the draft and from the call for mechanical skill from behind the battle lines in France. Women are filling many of the gaps, however, and have been found to be especially adapted for nearly all operations in motor car construction.

Bankers of Detroit believe the danger of any further radical action affecting the motor industry through legislation or governmental order is past. On three occasions it has been necessary to send strong delegations to Washington to sidetrack taxation proposals which would have been ruinous to the industry if enacted. They have pointed out that there is $800,000,000 of capital invested in the 550 motor vehicle manufacturing plants in 32 states and that 300,000 workers are employed. Their wages in 1917 approximated $300,000,000. The wholesale value of their products was $1,000,000,000. The production of passenger cars in the year 1917 was 1,800,000 and of commercial vehicles 181,000. This figure will be cut at least 50 per cent during 1918, owing to the conversion of plants to munitions work.

It has been computed that the motor and allied industries in the calendar year of 1918 will turn out approximately $1,000,000,000 of war materials. Completion of new plants under construction will take care of almost half of this business while the remaining facilities will be used to produce from $500,000,000 to $600,000,000 of passenger motor cars.

STANDARDIZED ARMY MOTOR TRUCK

Drive for Shipyard Labor

Countrywide Effort to Recruit 250,000 Workers for New Plants Nearing Completion Being Carried Out Vigorously

THAT victory in the war depends upon ships is being forced home upon the country more and more each day. For the country to build 6,000,000 tons of ships annually, which is its irreducible minimum if the country is to do its full share, according to Charles Piez, general manager of the Emergency Fleet corporation, the prerequisite is men. By the end of the present week it is hoped to have at least 250,000 men enrolled in a registered public service reserve. It is not intended to draw men from their present employment, as was explained in a letter to state governors sent out from Washington recently. When necessary to transfer men to needed points they are to be taken in such a manner as not to disturb manufacturing conditions. The first 60,000 men are required immediately to build three government shipyards to be completed in 60 days. It is planned to work that number in three 8-hour shifts, so that construction may be continuous.

In many sections schools and colleges are doing their part to turn out shipworkers and instruction in shipbuilding is being added to curriculums. At Newport News, a training camp is being conducted to fit men to be directors of training at their respective yards.

Much attention continues to be given to the housing problem. The Fore River Shipbuilding Corp., Quincy, Mass., stated recently that its force of 3000 would have to be increased to 4000 by the spring and that aid from the government to the extent of approximately $1,000,000 would be required to provide sufficient housing. Control of the housing proposition in all war industries including shipbuilding has been delegated to the department of labor, and according to a recent statement of the President and Secretary McAdoo, the $500,000,000 war finance proposition will have nothing to do with it.

Metal Trades Interpret Federal 8-Hour Day

Since many different interpretations have been made as to how the government's 8-hour day principle should apply on war contracts, the National Metal Trades association has endeavored to clarify the situation by conducting a correspondence investigation with the ordnance bureau at Washington. As a result, the following recommendations have been made to members:

First:—That, in accordance with the executive order of the President, and referring specifically to government work and to such as clearly comes under the law, there is no restriction as to the total number of hours short of 16 which may be worked, but that the provision requiring time and a half for overtime after eight hours is still in effect, *i. e.*, the amended statute now applies to wages and not hours of service.

Second:—Contracts that come under the law apply to "contractor or any subcontractor".

Third:—Where material manufactured comes directly within the provision of the law, rulings have been secured providing that methods of payment either by the piece price, premium or bonus, which result in a daily wage equal to that computed on the 8-hour basis with time and a half for overtime, has been acceptable.

Fourth:—That contracts for the purchase of material or articles which may be usually bought in the open market (except armor and armor plate) whether made to conform to particular specifications or not, do not come within the provision of the law.

Fifth:—It is recommended that members endeavor to secure the insertion, in any proposed contract with the government, of the explanatory not appearing in "Instructions to Bidders", which refers to the "Labor Disputes" clause.

Sixth:—So-called government mediators and conciliators have no authority to act other than in an advisory capacity, should the employer so desire. The government does not and cannot insist upon the closed shop.

Heroic Measures Overcome Flood and I. W. W.'s

The Puget Sound Iron & Steel Works, Tacoma, Wash., now engaged on a large amount of government work for the shipyards was compelled to use heroic measures to save its plant from the ravages of the Puyallup river during the recent floods and faced a serious labor situation at the same time. The plant managed not to lose any time, however. Sacks of sand and gravel to the number of 27,000 were thrown into the break which the river made toward the plant, threatening to undermine it. The works are situated in a bend of the stream and the river began carving out a new channel, which would have taken it directly under the plant.

When the danger was at its height the Industrial Workers of the World who were employed on the job struck for $1 an hour. This was in the evening and in order to save the plant the demands were granted. But the next day, the officers of the company having counselled with the military officers at Camp Lewis nearby, announced a rate of $5 per day for eight hours. The military police were brought in and the $5 schedule prevailed from that time on until the work was finished or placed in such position that the danger was past. When the military police were compelled to return to camp, they were succeeded by a contingent of the coast artillery and the plan of the Industrial Workers of the World to bring up the wages on the work to $2 an hour never materialized. The danger both as to labor troubles and the flood having passed the coast artillery has been recalled and the company is erecting a 1500 bulkhead to protect its property from future floods.

To Train War Cripples

The Norton Co., Worcester, Mass., has offered its plant and services to the United States government, "To fit and re-educate crippled soldiers for self-support." The plan is similar to that used by the Canadian government. The company proposes to take in five or more Worcester men each week and to attempt to train and re-educate them as soon as possible, providing the work does not interfere with their recovery from wounds. It is estimated that only 12 per cent of those severely crippled in the war must be re-educated. Men who come home on leave of absence to recuperate will be offered employment to their liking, if able to work, and unless they are obliged to return to their duties in the war zone will be continued in such employment.

Labor Notes

Approximately 125 riveters employed at the shipbuilding plant of the Texas Steamship Co., Bath, Me., struck early this month, giving as their reason, dissatisfaction with their rating and a desire for increased wages. The company has government contracts for ships.

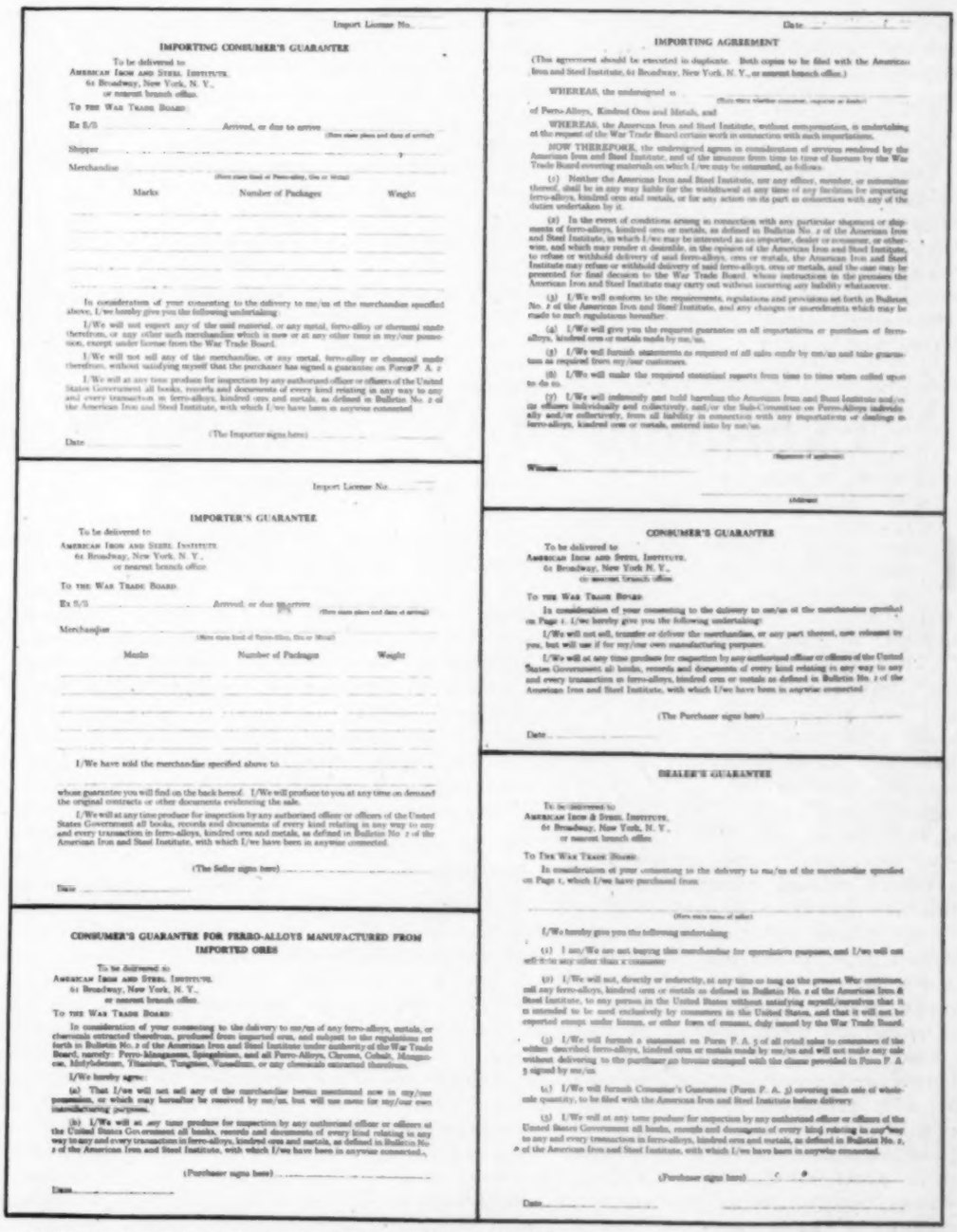
The Webster Mfg. Co., Tiffin, O., states that a statement made in these columns recently to the effect that foundrymen went out on strike after being employed to take the place of union men who wouldn't work with nonunion men, is erroneous. Its plant has been running continuously since it commenced to employ nonunion molders.

Stricter Control Over Ferro Alloys

American Iron and Steel Institute to Act as Clearing Agent for All Imports of Ferro Alloys, Kindred Ores and Metals Under New Regulations of War Trade Board—Forms to be Used

REGULATIONS covering the importation of ferroalloys and kindred ores and metals have been announced by the American Iron and Steel institute, in accordance with the will of a meeting of those interested in this business which was held recently in New York at the special request of Frederick E. Peterson, director of the bureau of imports of the war trade board. These regulations, which have been approved by the war trade board, have been drafted with a view to exercising the supervision over imports that is desired by the government, without interrupting or embarrassing in any way the ordinary transaction of business. The new regulations cover the importation of ferromanganese, spiegeleisen and all ferroalloys, chrome, chrome ore, cobalt, cobalt ore, manganese, manganese ore, molybdenum, molybdenum ore, titanium, titanium ore, tungsten, tungsten ore, scheelite, wolframite, vanadium, vanadium ore, or any chemicals extrated therefrom.

Licenses must be obtained by the importers from the war trade board; in all cases imports are to be consigned to the American Iron and Steel Institute, which will notify the importer. All bills of lading, together with invoices and other documents, should be sent by the foreign shipper, through the regular trade or commercial channels, to the parties by whom the material is purchased or for whose account it is shipped, and in no case to the American Iron and Steel institute. Upon receipt of the documents by the importer or recipient in this country, the bills of lading are to be presented to the American Iron and Steel institute by the importer, accompanied by an undertaking and guarantee in one or more of the following forms: Importing consumer's guarantee; consumer's guarantee for ferroalloys manufactured from imported ore; importer's and consumer's guarantee combined; importer's and dealer's guarantee combined. Blanks to be used in making out these guar-



Import License No. .....

IMPORTING CONSUMER'S GUARANTEE

To be delivered to
AMERICAN IRON AND STEEL INSTITUTE,
61 Broadway, New York, N. Y.,
or nearest branch office.

TO THE WAR TRADE BOARD:

Ex S/S ..... Arrived, or due to arrive .....
(Here state place and date of arrival)

Shipper .....

Merchandise .....
(Here state kind of Ferro-alloy, Ore or Metal)

Marks	Number of Packages	Weight

In consideration of your consenting to the delivery to me/us of the merchandise specified above, I/we hereby give you the following undertaking:

I/We will not export any of the said material, or any metal, ferro-alloy or chemical made therefrom, or any other such merchandise which is now or at any other time in my/our possession, except under license from the War Trade Board.

I/We will not sell any of the merchandise, or any metal, ferro-alloy or chemical made therefrom, without satisfying myself that the purchaser has signed a guarantee on Form P. A. 2

I/We will at any time produce for inspection by any authorized officer or officers of the United States Government all books, records and documents of every kind relating in any way to any and every transaction in ferro-alloys, kindred ores and metals, as defined in Bulletin No. 2 of the American Iron and Steel Institute, with which I/we have been in anywise connected.

(The Importer signs here) .....

Date .....

Import License No. .....

IMPORTER'S GUARANTEE

To be delivered to
AMERICAN IRON AND STEEL INSTITUTE,
61 Broadway, New York, N. Y.,
or nearest branch office

TO THE WAR TRADE BOARD:

Ex S/S ..... Arrived, or due to arrive .....
(Here state place and date of arrival)

Merchandise .....
(Here state kind of Ferro-Alloy, Ore or Metal)

Marks	Number of Packages	Weight

I/We have sold the merchandise specified above to .....

whose guarantee you will find on the back hereof. I/We will produce to you at any time on demand the original contracts or other documents evidencing the sale.

I/We will at any time produce for inspection by any authorized officer or officers of the United States Government all books, records and documents of every kind relating in any way to any and every transaction in ferro-alloys, kindred ores and metals, as defined in Bulletin No. 2 of the American Iron and Steel Institute, with which I/we have been in anywise connected.

(The Seller signs here) .....

Date .....

CONSUMER'S GUARANTEE FOR FERRO-ALLOYS MANUFACTURED FROM IMPORTED ORES

To be delivered to
AMERICAN IRON AND STEEL INSTITUTE,
61 Broadway, New York, N. Y.,
or nearest branch office.

TO THE WAR TRADE BOARD:

In consideration of your consenting to the delivery to me/us of any ferro-alloys, metals, or chemicals extracted therefrom, produced from imported ores, and subject to the regulations set forth in Bulletin No. 2 of the American Iron and Steel Institute under authority of the War Trade Board, namely: Ferro-Manganese, Spiegeleisen, and all Ferro-Alloys, Chrome, Cobalt, Manganese, Molybdenum, Titanium, Tungsten, Vanadium, or any chemicals extracted therefrom,

I/We hereby agree:

(a) That I/we will not sell any of the merchandise herein mentioned now in my/our possession, or which may hereafter be received by me/us, but will use same for my/our own manufacturing purposes.

(b) I/We will at any time produce for inspection by any authorized officer or officers of the United States Government all books, records and documents of every kind relating in any way to any and every transaction in ferro-alloys, kindred ores and metals, as defined in Bulletin No. 2 of the American Iron and Steel Institute, with which I/we have been in anywise connected.,

(Purchaser signs here) .....

Date .....

Date .....

IMPORTING AGREEMENT

(This agreement should be executed in duplicate. Both copies to be filed with the American Iron and Steel Institute, 61 Broadway, New York, N. Y., or nearest branch office.)

WHEREAS, the undersigned is .....
(Here state whether consumer, importer or dealer)

of Ferro-Alloys, Kindred Ores and Metals, and

WHEREAS, the American Iron and Steel Institute, without compensation, is undertaking at the request of the War Trade Board certain work in connection with such importations,

NOW THEREFORE, the undersigned agrees in consideration of services rendered by the American Iron and Steel Institute, and of the issuance from time to time of licenses by the War Trade Board covering materials on which I/we may be interested, as follows:

(1) Neither the American Iron and Steel Institute, nor any officer, member, or committee thereof, shall be in any way liable for the withdrawal at any time of any facilities for importing ferro-alloys, kindred ores and metals, or for any action on its part in connection with any of the duties undertaken by it.

(2) In the event of conditions arising in connection with any particular shipment or shipments of ferro-alloys, kindred ores or metals, as defined in Bulletin No. 2 of the American Iron and Steel Institute, in which I/we may be interested as an importer, dealer or consumer, or otherwise, and which may render it desirable, in the opinion of the American Iron and Steel Institute, to refuse or withhold delivery of said ferro-alloys, ores or metals, the American Iron and Steel Institute may refuse or withhold delivery of said ferro-alloys, ores or metals, and the case may be presented for final decision to the War Trade Board, whose instructions in the premises the American Iron and Steel Institute may carry out without incurring any liability whatsoever.

(3) I/We will conform to the requirements, regulations and provisions set forth in Bulletin No. 2 of the American Iron and Steel Institute, and any changes or amendments which may be made to such regulations hereafter.

(4) I/We will give you the required guarantee on all importations or purchases of ferro-alloys, kindred ores or metals made by me/us.

(5) I/We will furnish statements as required of all sales made by me/us and take guarantees as required from my/our customers.

(6) I/We will make the required statistical reports from time to time when called upon to do so.

(7) I/We will indemnify and hold harmless the American Iron and Steel Institute and/or its officers individually and collectively, and/or the Sub-Committee on Ferro-Alloys individually and/or collectively, from all liability in connection with any importations or dealings in ferro-alloys, kindred ores or metals, entered into by me/us.

(Signature of undersigned)

Witness .....

(Address)

CONSUMER'S GUARANTEE

To be delivered to
AMERICAN IRON AND STEEL INSTITUTE,
61 Broadway, New York N. Y.,
or nearest branch office

TO THE WAR TRADE BOARD:

In consideration of your consenting to the delivery to me/us of the merchandise specified on Page 1, I/we hereby give you the following undertaking:

I/We will not sell, transfer or deliver the merchandise, or any part thereof, now released to you, but will use it for my/our own manufacturing purposes.

I/We will at any time produce for inspection by any authorized officer or officers of the United States Government all books, records and documents of every kind relating in any way to any and every transaction in ferro-alloys, kindred ores or metals as defined in Bulletin No. 2 of the American Iron and Steel Institute, with which I/we have been in anywise connected.

(The Purchaser signs here) .....

Date .....

DEALER'S GUARANTEE

To be delivered to
AMERICAN IRON & STEEL INSTITUTE,
61 Broadway, New York, N. Y.,
or nearest branch office

TO THE WAR TRADE BOARD:

In consideration of your consenting to the delivery to me/us of the merchandise specified on Page 1, which I/we have purchased from

.....
(Here state name of seller)

I/We hereby give you the following undertaking:

(1) I am/We are not buying this merchandise for speculative purposes, and I/we will not sell it to any other than a consumer.

(2) I/We will not, directly or indirectly, at any time so long as the present War continues, sell any ferro-alloys, kindred ores or metals as defined in Bulletin No. 2 of the American Iron & Steel Institute, to any person in the United States without satisfying myself/ourselves that it is intended to be used exclusively by consumers in the United States, and that it will not be exported except under license, or other form of consent, duly issued by the War Trade Board.

(3) I/We will furnish a statement on Form P. A. 5 of all retail sales to consumers of the within described ferro-alloys, kindred ores or metals made by me/us and will not make any sale without delivering to the purchaser an invoice stamped with the clause provided in Form P. A. 3 signed by me/us

(4) I/We will furnish Consumer's Guarantee (Form P. A. 3) covering each sale of wholesale quantity, to be filed with the American Iron and Steel Institute before delivery.

(5) I/We will at any time produce for inspection by any authorized officer or officers of the United States Government all books, records and documents of every kind relating in any way to any and every transaction in ferro-alloys, kindred ores and metals, as defined in Bulletin No. 2, of the American Iron and Steel Institute, with which I/we have been in anywise connected.

(Purchaser signs here) .....

Date .....

FORMS TO BE USED BY IMPORTERS AND CONSUMERS IN BRINGING IN FERROALLOYS, KINDRED ORES AND METALS

antees may be obtained from the American Iron and Steel institute. Representatives of the institute have been appointed at New York and San Francisco, clothed with custom house power of attorney for the endorsement of bills of lading as required by the United States treasury regulation. Additional representatives in other cities will be appointed as may appear necessary. These representatives will endorse bills of lading covering importations consigned to the institute only when the guarantee requirements have been satisfactorily complied with. Inasmuch as shipments frequently arrive before documents, the shipper is advised whenever possible to mail the signed bill of lading, one stamped consular invoice and a copy of the commercial invoice on the vessel carrying the shipment.

Records to be Kept

The institute will keep a record of all importations of ferroalloys and kindred ores and metals released under the guarantees, which will show the particulars indicating the shipper, the importer and the consumer to whom the materials have been released, and any other data necessary to indicate its final disposition and consumption. This record will be checked from time to time by government inspection of and comparison with the books and records of importers, dealers and consumers. Reports may be required from time to time showing stocks on hand at a given period, actual consumption and other data. These reports will be confidential and will be compiled by the institute for the information of the war trade board. With this information as a basis, modifications or changes may be made from time to time in the regulations and practice controlling the importation, allotment and distribution of supplies of ferroalloys and kindred ores and metals so that the best interests of the importers, dealers and consumers as well as the public, properly may be served. The institute also will use its best efforts to assist in the distribution of imports and supplies upon an equitable basis, primary consideration being given to the requirements or necessities of the government program.

One of the duties of importers when negotiating for fire and marine insurance, under the regulations, is to have substantially the following clause inserted in their policies: "In case the assured holds the property covered by this policy under an agreement with the war trade board of the United States of America, it is mutually understood and agreed between the company and the assured that in the event of a loss occurring as a result of which the company shall take over any part or all of the property insured thereby, then the company shall be bound by the terms and conditions of the agreement held by the assured with the said war trade board."

Committee in Charge

The subcommittee on ferroalloys which has charge of the regulations covering the importation of ferroalloys and kindred ores and metals, is as follows: James A. Farrell, chairman; E. A. S. Clarke, E. G. Grace, E. J. Lavino, A. D. Ledoux, E. F. Price, Frank Samuels, F. W. White and A. A. Fowler, secretary. A bulletin has been issued by the institute which contains not only the complete regulations, but blanks for the various forms of guarantee, for dealer's monthly statements of retail sales and also for the importing agreement.

Evolution of the Modern Steel Car

BY HENRY P. HOFFSTOT

IN an address before the Traffic club, of Pittsburgh, Feb. 11, on the "History and Development of Steel Cars in America", Henry P. Hoffstot, of the Pressed Steel Car Co., Pittsburgh, revealed much interesting information on steel cars in general and traced their evolution for a period extending over several years. Especially did he discuss the increasing popularity of the car of heavy capacity showing how 100-ton units now are being employed. One railroad has now become interested in a 120-ton car and in connection with this Mr. Hoffstot said:

"Its officials felt that the concentration of a 120-ton load in one car would not only shorten up their trains, thereby making a less number of units for a given train per revenue tonnage but also a less number of operations in their dumping machines at their terminals, and would also reduce the number of wearing parts to be maintained as well as eliminate to a great extent the extra long sidings which would otherwise be required to handle the same tonnage in cars of lighter capacity. In other words some of the general reasons which brought about the change from the 30 and 40-ton capacity wooden cars to 40 and 50-ton steel cars are now tending to bring about the use of much heavier capacity steel cars. The official of this particular railroad, fearful lest a mistake might be made in ordering at the present time a larger number of cars in which such a radical change would be made, elected to have four of the larger car companies each build a sample car.

Details Left to Car Companies

The engineers of the railroad at that time supplied the car companies with the maximum height and width and approximate length which they believed would carry the required tonnage and left the details of the design of the cars to each of the car companies. Their idea was to get these samples into actual service and if experience actually showed that cars of 120-ton capacity could be more economically used than 50 and 70-ton cars they could pick out the best features of each of the four cars and design a unit which in their opinion would be best suited for the service. These four cars have all been delivered and are now undergoing trial."

Mr. Hoffstot referred to the fact that rulings of the Master Car Builders' association in the construction of all cars make it necessary to comply with certain regulations so far as clearances, strength, etc., are concerned, but do not go very far toward bringing about standard designs of cars. For many years, he pointed out, this question has received more or less attention and three or four years ago a committee of five builders was appointed by the railroad presidents representing the American Railway association to go carefully into this matter. Later 10 or 12 railroad representatives were placed on this committee. After three years of labor they made their report and submitted specifications, and blue prints covering box cars and gondolas of several capacities. This work is now being continued by another committee and railroad men are keenly watching its progress, for the greatest advances that can be made in steel car construction at this time will come with the adoption of cars of standard design

for use all over the entire country.

"No further progress along these lines can, however, be expected until congress decides whether the railroads after the war are to remain the property of and be operated by their real owners under the control of the interstate commerce commission," Mr Hoffstot added, "or whether permanent government ownership is to prevail."

In tracing the development of the steel car, Mr. Hoffstot said:

"A good many years ago some few all-steel cars were built and placed in operation by some of the steel companies and these cars are, I believe, still in service. The change from the use of wood to steel in the construction of coal cars in America was not brought about at one time but was extremely gradual in its development. In the early nineties, C. T. Schoen commenced making pressed steel car shapes in his little plant in lower Allegheny, Pa., and for years was supplying the railroads with pressed steel center plates, side bearings, stake pockets, push pole pockets, etc., for use in connection with the construction of wooden cars. During the same time the Fex plant, Penn avenue, Pittsburgh, was furnishing pressed steel trucks and truck specialties to railroads for use on wooden equipment.

"About 1895 Charles T. Schoen conceived the idea of building steel cars on a large scale. The following year the first ones were ordered by the Pittsburgh, Bessemer & Lake Erie railroad and shortly after by the Pittsburgh & Western railroad and the Pittsburgh & Lake Erie road. It is therefore to the foresight of the officers of these three companies that a great deal of the credit for bringing about the change from wood, or wooden cars with steel trucks and a few steel specialties to the all-steel car, must be given. Mr. Schoen conceived the plan but to show the public it was necessary to find a buyer on whose railroad a demonstration of the cars in actual operation could be made. The heads of these three companies took the chance and that they made no mistake in their judgment is now well recognized. The demand for this type of car grew rapidly. Its construction virtually revolutionized railroad traffic of this country. The first hopper cars were built to carry coal and while stenciled 50-ton were hardly of 40-ton capacity so far as present requirements are concerned. Probably 85 to 90 per cent of these cars are still running after 20 years of service in and out of the Pittsburgh district which with its bituminous coal and ore gives the cars as severe service as could be received by them anywhere in this country.

Capacity in Demand

"The railroads are continually demanding cars of heavier capacity so that the increasing volume of tonnage offered can be handled more economically on our congested railroads. Early in this century the combination of pressed steel and structural steel was used in car construction, and this is the type of construction most commonly used today. Often an additional ton of steel carefully applied in the designing of a steel car will make it so much stronger and better able to withstand the shocks, wear and tear received in unfair treatment that by the end of 12 to 15 years it can be renovated at a comparatively small expense."

Obituaries

HENRY H. HODELL, who with his two sons organized the Cleveland Galvanizing Works Co., Cleveland, in 1886, and who served as that company's president, died at Mount Sinai hospital in that city, Sunday night, Feb. 10, at the age of 68. Mr. Hodell was born in Alsace and came to America when a boy, locating in Cleveland. After leaving school he worked in a rolling mill and later organized the Hodell & Collins Co., where he remained until he founded the Cleveland Galvanizing Works Co. At the time of his death he was also president of the Van Dorn & Dutton Co., Cleveland, tool manufacturers, and was likewise a director of the Van Dorn Electric Tool Co., and in the Equity Savings & Loan Co. His two sons, F. G. Hodell and Howard H. Hodell, survive him and will continue to conduct the galvanizing works company.

John J. Adams, for more than 40 years a manufacturer of cutting dies, chisels, cutting presses, engines and machinery in Worcester, Mass., died in the Memorial hospital, in that city, Feb. 7, from acute appendicitis, aged 60 years.

Abram P. Morris, president of the Morris Machinery Co., Newark, died recently of pneumonia, at his home in Lyons Farms, N. J., at the age of 54.

W. B. Williams, for many years superintendent of the tube department at Benwood, W. Va., of the Wheeling Steel & Iron Co., Wheeling, W. Va., died recently at Pleasantville, N. J., where he had made his home since July last.

James G. Doak, construction engineer, died recently in Philadelphia at the age of 52. For more than 25 years he had been engaged in the construction business and up until about 10 years ago was partner of James Doyle. During that period he supervised the erection of many of Philadelphia's largest buildings.

Arthur Grover Cutting, age 37, general manager of the Pittsburgh branch of the H. W. Johns-Manville Co., died resently, following an attack of rheumatism. Mr. Cutting came to Pittsburgh about six years ago from the New York office of the Johns-Manville company and prior to that connection he served as purchasing agent for the Chapman Valve Co., Ludlow, Mass.

Henry Elliot Sprague, formerly president of the Colorado Coal & Iron Co., predecessor of the Colorado Fuel & Iron Co., Denver, Colo., died recently at his home in New York City. He was born 82 years ago at Gibraltar, Spain, where his father was United States consul under President Polk. For years Mr. Sprague was a leading merchant in New York City.

Arthur Eastman Whitney of the Whitney Machine Co., Winchester, Mass., son of Joel Whitney, that company's founder, died at his home there recently, aged 70. He perfected many tannery machine improvements and took an active interest in Winchester's civic affairs. Among his three sons is Robert S. Whitney, president of the Whitney Machine Co.

Erastus B. Badger, born in Boston 90 years ago, died recently at his home on Beacon street in that city. Eight years ago he retired from active business as president of the present E. B. Badger & Sons Co., which he founded and which is now one of the largest chemical engineering and chemical apparatus manufacturing concerns in the country. Prior to that he was a partner in the business of Rice & Jenkins, coppersmiths, to which he was apprenticed by his father in 1844. Two sons serve as president and treasurer of the E. B. Badger & Sons Co., Daniel B. and Arthur C. Badger respectively.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

ANDREW D., or Don Armitage, as he is well known to the iron and steel trade, was elected president of the Whitman & Barnes Mfg. Co., Akron, O., manufacturers of twist drills, reamers and other tools, at the recent annual meeting. He succeeds A. B. Rinehart, who disposed of his holdings and retired. Mr. Armitage began his affiliation with the company in 1892 as a mechanic at the Akron plant and in 1900 was made purchasing agent. Two years later, he was transferred to the Chicago plant, and became superintendent there in 1904. Subsequently he became general manager of the Akron, Chicago and St. Catharines, Ont., plants, and Canadian sales manager. He held these positions for seven years and then was elected vice president and manager of the Chicago and Canadian factories. He filled these posts from 1915 until his elevation to the presidency. Mr. Rinehart's place on the board of directors has been assigned to F. A. Seiberling. William H. Eager, former treasurer, who takes the vacant vice presidency, is succeeded by E. A. Fisher, who has been assistant treasurer. C. H. Tuttle was made assistant secretary, W. E. Rowell being re-elected secretary. A. B. Hall remains vice president, while C. E. Sheldon, who has been with the company 50 years, continues as chairman of the board.

J. F. Corlett, of J. F. Corlett & Co., Cleveland, is spending the month of February at Windermere, Fla.

John L. Orrell, formerly superintendent of the Union Foundry & Machine Co., Pittsburgh, is now affiliated with the Kirk Supply Co., Pittsburgh.

David P. Ballard, formerly with the purchasing department of the Wellman-Seaver-Morgan Co., Cleveland, is now associated with the National Acme Mfg. Co., Cleveland.

Charles B. Pearson, formerly with the Dail Steel Products Co., Lansing, Mich., has accepted the position of factory manager of the Steel Furniture Co., Grand Rapids, Mich.

Guy E. Tripp, who, as recently announced, was appointed chief of the production division of the ordnance department to supervise and stimulate the production of all ordnance supplies, has received a colonel's commission.

Thomas Hackley has accepted a position with the Gorham Mfg. Co., Providence, R. I., as chief electrician. He formerly was electrician for the Fall River Iron Works Co., Fall River, Mass.

James D. Frisbie, formerly manager of the St. Louis office of the Cohen-

ANDREW D. ARMITAGE

Schwartz Rail & Steel Co., has resigned and accepted a similar position with Hansman & Wimmer, scrap dealers, Pittsburgh.

John F. Guider was recently elected vice president of the Cadillac Motor Car Co., Detroit, in charge of manufacture. He was formerly factory superintendent of the Pierce-Arrow Motor Car Co.

David Spence has severed his connection with the Riverside Foundry Co., Kalamazoo, Mich., to accept a position as manager of the New England Foundry & Machine Co., Campello, Mass.

J. C. Ferver, who has been affiliated with the Youngstown Sheet & Tube Co., Youngstown, O., as assistant chief electrician, resigned Feb. 1, and is now chief electrician of the Submarine Boat Co., Newark, N. J.

C. L. O. Graul, who since December 1914, has been assistant to the superintendent of the coke oven plant of the By-products Coke Corp., Chicago, has been promoted to the staff of C. G. Tufts, general superintendent of the Semet-Solvay Co., Syracuse, N. Y.

N. C. Back is now affiliated with the sales force of the Cataract Refining & Mfg. Co., Buffalo, manufacturer of core oil, having resigned as foundry superintendent for Hart & Crouse, Utica, N. Y., manufacturer of heating apparatus.

M. J. Somers has been made foundry superintendent of the new Blanchester, O., plant of the Fulflo Pump Co., Cincinnati. He was formerly assistant superintendent of the American Seeding Machine Co.'s foundry at Springfield, O.

Evan F. Jones, treasurer and general manager of the Morgan Spring Co., Worcester, Mass., will sail from New York, Feb. 16, on the steamship BRAZOS, of the New York & Porto Rico Steamship Co., for a 16-days' cruise of the West Indian islands.

Fredcrick R. Harris, civil engineer, U. S. N., formerly general manager of the Emergency Fleet corporation, has been made public works officer of the Norfolk navy yard. He at one time was chief of the bureau of yards and docks of the navy department.

O. P. Palmer, Stratford, Conn., was recently appointed secretary and purchasing agent of the Artillery Fuse Co., Wilmington, Del. For more than 15 years he was affiliated with the Remington Arms-Union Metallic Cartridge Co., Bridgeport, Conn.

P. J. Phillips, in charge of Spanish American sales for the steel department of the Federal Export Corp., New York, left recently on an extended trip through the West Indies, Central America, and northern South America in the interests of his firm.

T. K. Webster was chosen president of the Amalgamated Machinery Corp., at the annual meeting of the board. Other officers of the company include: Vice president, L. I. Yeomans; secretary, Walter A. Strong; treasurer, C. M. Moderwell.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

JOHN J. SHANNON, who recently was made general manager of the Woodward Iron Co., Woodward, Ala., and who has been connected with various blast furnaces for 25 years, was among the first to start deep ore mining operations in the south. He was interested in such a proposition at Shannon, several miles below Birmingham, which was named after him, and later was sold to the Gulf States Steel Co. Mr. Shannon was born in England, and when still a young man, came to this country to locate in Lehigh, Pa. About 42 years ago he moved to the south, locating at Rising Fawn, Ga., and then for 14 years had charge of the Oxmoor furnaces of the Tennessee Coal, Iron & Railroad Co. Subsequently he became connected with the Alabama Steel & Wire Co., Gadsden, Ala., and later accepted a position with the Sloss-Sheffield Steel & Iron Co. After a period, he became affiliated with the Woodward Iron Co., and was appointed general superintendent of furnaces, which position he held until his recent promotion.

Elbert H. Gary, chairman of the United States Steel Corp., has left for a stay of several weeks at Miami, Fla.

A. O. Backert, editor of *The Foundry*, Cleveland, addressed the regular monthly meeting of the New England Foundryment's association, Boston, Feb. 13, on "Machine Molding".

C. W. Hodges has resigned as general material supervisor of the American Locomotive Co. to become general purchasing agent for the Worthington Pump & Machinery Corp., 115 Broadway, New York. The change became effective Feb. 1. Mr. Hodges succeeds I. C. Roger.

Paul Debevoise, of the Debevoise-Anderson Co., 56 Liberty street, New York, dealer in pig iron and coke, has received a commission as major of infantry and is stationed at Camp Dix, N. J. W. K. Callow, also of that company, has been granted a warrant as ordnance sergeant.

J. W. Beattie, chief clerk of the Inland works of the Republic Iron & Steel Co., East Chicago, Ind., for three years, has accepted a similar position with the Fulton Iron Works Co., St. Louis, Mo., manufacturer of Diesel oil engines, sugar cane mills, etc.

E. F. Jones, formerly sales manager of the G. H. Williams Co., Erie, Pa., manufacturer of grab buckets and conveying equipment, has been appointed to succeed C. C. Williams as president and general manager. Mr. Williams recently was killed in an automobile accident.

Frank Raiff has been elected a director of the American Smelting & Refining Co. and the American Smelters Securities Co., 120 Broadway, New York City, succeeding S. W. Eccles, deceased. Mr. Raiff is at present traffic manager of the American Smelting & Refining Co.

Robert P. Lamont, president of the American Steel Foundries, Chicago, has been commissioned a lieutenant colonel in the war department and has been appointed assistant chief in the procurement division of the ordnance department.

Edgar S. Fassett, formerly general manager of the United Traction Co., Albany, N. Y., has been elected secretary and director of Goldschmidt & Forbes, Inc., 90 West street, New York, dealers in all kinds of metals and metal products. He assumed his new duties Feb. 1.

George M. Kerr, Worcester, Mass., eastern sales engineer of the Oxweld Acetylene Co., Newark, N. J., has been commissioned a second lieutenant in the army and will have charge of oxyacetylene welding at the United States filing stations, with headquarters in Washington.

William S. Trask, for 16 years connected with the P. & F. Corbin division of the American Hardware Corp., New Britain, Conn., as superintendent of design and construction, has resigned. His plans for the future are uncertain. The employes presented him with a watch chain and charm set with diamonds.

John Skelton Williams, comptroller of the currency, has been made director of the division of finance and purchases of Director General McAdoo's permanent railroad staff. Frank McManamy, chief inspector of locomotives for the interstate commerce commission, has been made manager of the locomotive section.

Leo G. Smith, formerly general superintendent of the Prime Steel Co., Milwaukee, and later promoter of the Electric Steel Casting Co., Milwaukee, is now manufacturers' agent for a number of northwestern foundries. Among his clients is the Western Crucible Steel Castings Co., Minneapolis, Minn.

R. Z. Virgin, who has been superintendent of the mining department of the Wheeling Steel & Iron Co., Wheeling, Va., resigned recently to accept a position as instructor in the mining extension work in the West Virginia University at Morgantown, W. Va. He will travel through the state, giving lectures on mining and mine management.

G. F. Evans, formerly connected with the W. C. Moore Co., Columbus, O., has been appointed supervising engineer for the National X-Ray Reflector Co., Chicago. His territory will comprise the state of Ohio, except Toledo and Cincinnati, West Virginia and western Pennsylvania, and his headquarters are in the Columbus Savings & Trust building, Columbus, O.

Waldo H. Marshall, who formerly was president of the American Locomotive Co., New York, and more recently associated with J. P. Morgan & Co., on the staff of Edward R. Stettinius in the munitions department, was recently appointed assistant to Colonel Guy E. Tripp, head of the division of production of the ordnance department at Washington.

Major Weaver H. Rogers, president of Weaver H. Rogers & Co., First National bank, Pittsburgh, dealers in iron and steel, has been in the government's service for several months at Washington. He was assigned to that city as head of the iron and steel manufacturing facilities branch of the production section of the carriage division, Sixth and B streets N. W. Captain H. W. Reed, an engineer of Philadelphia, was affiliated with him in that division. Major Rogers was likewise delegated as a representative of the ordnance bureau, war department, on certain special matters.

Steel Exports in 1917 Set Record

Tremendous Tonnage in First Six Months of Year Makes Up For Falling Off in Second Half—Year's Total 6,443,161 Tons—December With Sharp Gain, Makes Surprising Showing

ALTHOUGH conditions during the greater part of 1917, and especially in the last six months, were exceedingly unfavorable to foreign commerce, the total tonnage of iron and steel products exported for the calendar year exceeded the 1916 shipments by 341,287 tons. The report of the bureau of foreign and domestic commerce shows that 6,443,161 tons of these products were shipped from the United States to other countries in the 12-month period ending Dec. 31, 1917, compared with a tonnage of 6,101,874 in the year 1916. This large total is due to the fact that shipments during the first six months of the year were at a record-breaking rate, in three of these months the tonnage having exceeded the 600,000 mark. Exports for the last half of the year fell off.

It is surprising to note the remarkable increase in foreign shipments during the month of December. Exports for that month amounted to 654,867 tons, compared with 580,988 tons in December, 1916, this being the first month since June to show an increase in tonnage over the 1916 figure. In November, 1917, the total of these shipments was only 473,549 tons, or 181,318 tons less than in December. The tonnage of billets, ingots and blooms reached a total of 204,555, which is almost equal to the record set in October, and 41,654 tons more than December a year ago, when exports amounted to 162,901 tons. For November, 1917, the tonnage was 150,120. Other products showing notable increases were steel bars and sheets and plates. Pig iron exports, which fell off so sharply in November, were again normal in December, with a total of 66,573 tons. This total is much below the December, 1916, figure of 105,195 tons, but is greater than the total for any month since June.

In valuation, iron and steel exports for the calendar year show an increase of $372,476,353, compared with the 1916 total. In the 12 months of 1917, $1,243,803 worth of iron and steel products were shipped from this country, and in 1916, these shipments amounted to $871,327,322. For the month of December, 1917, this valuation was $119,635,609, compared with $97,970,114 in November, 1917, and $88,876,120 in December, 1916.

Imports of iron ore for the year 1917 were 971,663 tons, compared with 1,325,736 tons in 1916, a decrease of 354,073 tons. In 1915, 1,341,281 tons were imported.

A comparison of shipments of iron and steel products into the United States for the years 1917 and 1916 shows very little change. Imports for 1917 amounted to 321,667 tons, a gain of 1797 tons, compared with the 1916 total of 319,870 tons. For the last three months of 1917, the tonnage of imports was very small, the figures being 13,769 tons, 13,995 tons and 14,225 tons, for December, November and October, respectively.

IRON ORE IMPORTS, GROSS TONS

	December,		Twelve months ending December,	
	1917	1916	1917	1916
Spain	2,510	17,952	152,713	161,422
Sweden	2,594	18,711	63,715	212,063
Canada	732	.....	178,785	136,835
Cuba	51,801	81,380	546,069	716,571
Oth. countries	526	.....	30,381	98,845
Total	58,163	118,043	971,663	1,325,736

EXPORTS, GROSS TONS.

1916	Pig iron	Semi-finished material
Jan.	19,319	55,315
Feb.	15,061	87,406
Mar.	19,439	107,674
Apr.	18,518	88,764
May	28,293	142,782
June	48,770	116,316
July	28,718	135,827
Aug.	60,264	160,921
Sep.	64,122	163,104
Oct.	92,756	162,669
Nov.	106,781	120,883
Dec.	105,195	162,901
1917		
Jan.	69,146	183,656
Feb.	49,018	131,566
Mar.	69,629	193,469
Apr.	44,783	162,209
May	61,112	168,158
June	81,999	192,133
July	32,368	112,085
Aug.	62,083	189,083
Sep.	44,287	148,932
Oct.	47,200	204,724
Nov.	25,733	150,120
Dec.	66,573	204,555

IRON AND STEEL EXPORTS, GROSS TONS

	December,		Twelve months ending December	
	1917	1916	1917	1916
Scrap	857	14,860	150,560	212,765
Pig iron	66,573	105,195	655,265	607,236
Steel billets, ingots and blooms	204,555	162,901	2,032,039	1,504,562
Wire rods	20,759	13,414	181,972	158,281
Steel rails	50,935	41,125	512,638	540,828
Steel bars	78,569	63,288	626,454	774,440
Iron bars	6,919	6,341	56,331	74,068
Struc. iron and steel	34,567	35,684	296,968	300,594
Hoops, bands and scroll.	7,343	3,038	58,876	44,001
Sh'ts & plates	84,882	50,190	831,719	515,549
Tin and terne plate	24,025	18,229	233,296	227,387
Barbed wire	14,907	15,821	192,395	418,874
All oth. wire	17,053	14,484	201,422	264,137
Cut nails	617	223	4,527	4,752
Wire nails	16,829	11,012	114,911	150,170
All oth. nails incl. tacks	2,099	1,303	21,001	12,353
Pipes & fit'gs.	16,538	19,921	205,640	228,569
R. R. spikes	1,286	1,391	21,190	23,852
Bolts, nuts, rivets and washers	4,365	2,226	32,264	29,226
Horseshoes	759	145	8,492	7,806
Cast radiators	430	197	5,201	2,424
Total	654,867	580,988	6,443,161	6,101,874

IRON AND STEEL IMPORTS, GROSS TONS

	December,		Twelve months ending Dec.,	
	1917	1916	1917	1916
Scrap	3,428	31,424	180,034	116,039
Pig iron	5,143	8,176	76,786	135,349
Steel ingots, blooms and billets	2,446	2,556	44,197	26,141
Wire rods	332	653	1,060	4,130
Rails	1,428	522	9,263	26,299
Bar iron	1	277	2,240	7,701
Structural	777	261	6,215	1,473
Sheets & plates	214	235	1,748	1,730
Tin and terne plate	.....	34	124	1,008
Total	13,769	44,138	321,667	319,870

IMPORTS AND EXPORTS, GROSS TONS.

1915	Imports	Exports
July	20,858	380,340
August	27,556	405,949
September	23,345	382,113
October	34,318	349,843
November	37,131	362,764
December	35,408	353,853
1916		
January	15,824	360,102
February	20,279	368,980
March	15,159	438,649
April	20,176	384,452
May	32,114	538,657
June	26,885	515,214
July	14,774	502,330
August	23,255	571,401
September	25,559	643,762
October	30,169	588,892
November	42,545	554,219
December	44,134	580,988
1917		
January	40,192	608,105
February	24,379	449,099
March	37,280	606,559
April	48,213	519,397
May	26,013	588,514
June	28,419	614,600
July	28,859	357,776
August	22,635	519,518
September	20,196	482,311
October	14,225	557,138
November	13,995	473,549
December	13,769	654,867

May Exempt Steel From Embargoes

Plans Being Worked Out to Grant Preferential Transportation to Mill and Furnace Products and Materials—McAdoo to Pass on Proposal to Keep Industry Clear of Recent Stagnating Conditions

WASHINGTON, Feb. 12.—Increased steel production awaits the action of Director General McAdoo. Plans worked out and submitted by steel traffic officials and passed on by various government transportation experts are in his hands. Acceptance of the plans, which include the exemption of all iron and steel raw and finished products from general railroad embargoes, is regarded as an essential move if the nation's steel war needs are to be met. The plans go farther than that, however, and include placing the steel freight in a preferential class.

The railroad administration, going further than its provisions in ordering food, fuel and war essentials exempt from the general embargo on the Pennsylvania, the Philadelphia & Reading and the Baltimore & Ohio railroads and the individual embargoes on other lines, last week ordered preferential handling of all shipments of grain, flour, cornmeal and other cereal products. The car service committee of the interstate commerce commission is working up a more comprehensive list and steel men insist their products must be included if war steel is to be manufactured.

Thousands of Tons Tied Up

The seriousness of the traffic problem, as affecting the steel mills, developed when the shipping board delved into the question with a view to moving plates consigned to the various steel shipyards throughout the country. The investigation disclosed thousands of tons of steel piled up along mill tracks and in warehouses awaiting shipment. Cars were not spotted to keep pace with the output of the mills and as a result the yards were falling behind in meeting their schedules.

In the meantime, the steel traffic men, acting under A. G. Young, chairman of the American Iron and Steel institute's subcommittee on traffic conditions, pointed out to the government that the stagnated condition of the industry was due to the lack of cars to haul raw materials to the mills and to take away the finished products. Mr. Young was in Washington the latter part of last week and took up the question with the traffic division of the railroad director's staff. The matter then was submitted to Mr. McAdoo.

It has been pointed out that whatever action the director may take, it must be broad enough to not hamper the mills either through receipt of coal, coke, ores, etc., or in the delivery of any product consigned to the government or to seaboard for export. In the case of plates for the shipping board, the board's traffic department obtained special authority to move several train loads of ship steel. Near the close of the week the shipping board declared nearly 9000 cars of steel and wood consigned to its yards were tied up somewhere in the traffic jam.

Improved Weather Helps

With the weather clearing, sufficient coal for industrial needs is expected to be obtained through reduction in domestic consumption and in the ability of the railroad to make better progress in deliveries. This weather factor is also expected to assist in delivery of other freight, which has likewise been held up.

To study traffic conditions as they exist, Mr. McAdoo has appointed a special committee composed of B. L. Winchell, traffic director of the Union Pacific; G. F. Randolph, commissioner of the trunk lines, and T. C. Powell, vice president of the Southern railway. This staff, which will consider the traffic problem as a whole, will have the assistance of the regularly established traffic department of the administration which has been subdivided to meet the needs of the various government departments. Edward Chambers, vice president of the Santa Fe, has been permanently retained a traffic director. He will be assisted directly by C. B. Buxton, Philadelphia, and Dallas, Tex.; Robert C. Wright, Philadelphia, traffic manager of the Pennsylvania, for freight; Gerrit Fort, passenger traffic manager of the Union Pacific, for passenger; and G. A. Kirtley, New York, assistant to Vice President Stone, of the Erie, for priorities.

J. F. Holden, Kansas City, vice president of the Kansas City Southern, is handling shipping board traffic. H. M. Adams, St. Louis, vice president of the Missouri Pacific, represents the war department. H. P. Anewalt, Los Angeles, traffic manager of the Santa Fe's coast lines, has been assigned to the navy. J. A. Middleton, Kansas City, traffic manager of the Frisco lines, will deal with fuel administration traffic problems, and the food administration will be represented by Mr. Chambers.

Trade Board Watches Imports Carefully

WASHINGTON, Feb. 12.—Thorough application of the provisions in the trading-with-the-enemy and the espionage acts applying to imports of the United States is being made by the import bureau of the war trade board. In October the President assumed the power given him over imports and delegated it to the war trade board. As strict observance of the possibility of an enemy or an ally of an enemy benefiting through the importation of any commodity into this country either for use or for re-export is made by the board through its bureau as is maintained by the export bureau on any consignment destined for points beyond the borders of the United States.

The general information sought by the bureau of imports on applications for import license—applications must be made in duplicate—is similar to that required for export, names, addresses, kind, size, weight, etc., of commodity, etc. In addition, however, the importer, or the applicant for license, must give the country in which the goods were bought, the name of the port from which they will be shipped, the port of entry in the United States, whether export license has been obtained from the country of shipment, whether the commodity is to be used for the applicant's own manufacturing use

or to be held in stock or for the account of some one else, his name, the quantity of the same goods on hand, whether the applicant was importing the same kind of goods prior to the outbreak of the war in Europe and how long business relations have been maintained with the consignors and producers named.

Information must also be given as to whether a general license has been obtained to trade with an enemy, if any person in the transaction is an enemy or an enemy ally, the exact nature of the connection of the person with the transaction and the full method of proposed payment with names of banks and agencies. Application for import license must be made on form WTB8, white for the original and pink for the duplicate.

The application for license to trade with an enemy, to cover imports, must describe fully the transaction, giving, in general, the same information as required on the application for an import license. If a license expires before importation is made, new application must be made and the old license returned. Documents to be presented as exhibits must accompany the original application, in each case.

Since promulgation of the new regulations covering exports, the war trade board has announced that all licenses issued on or after Jan. 22, 1918, shall be good for periods of 90 days only and no extension will be granted. This is to enable manufacturers who contract for future delivery better to meet their obligations and to relieve congestion at ports which in the past was caused, to an extent, by expiration of the 60-day licenses. Extensions will be given, however, in the case of licenses granted on or before Jan. 21.

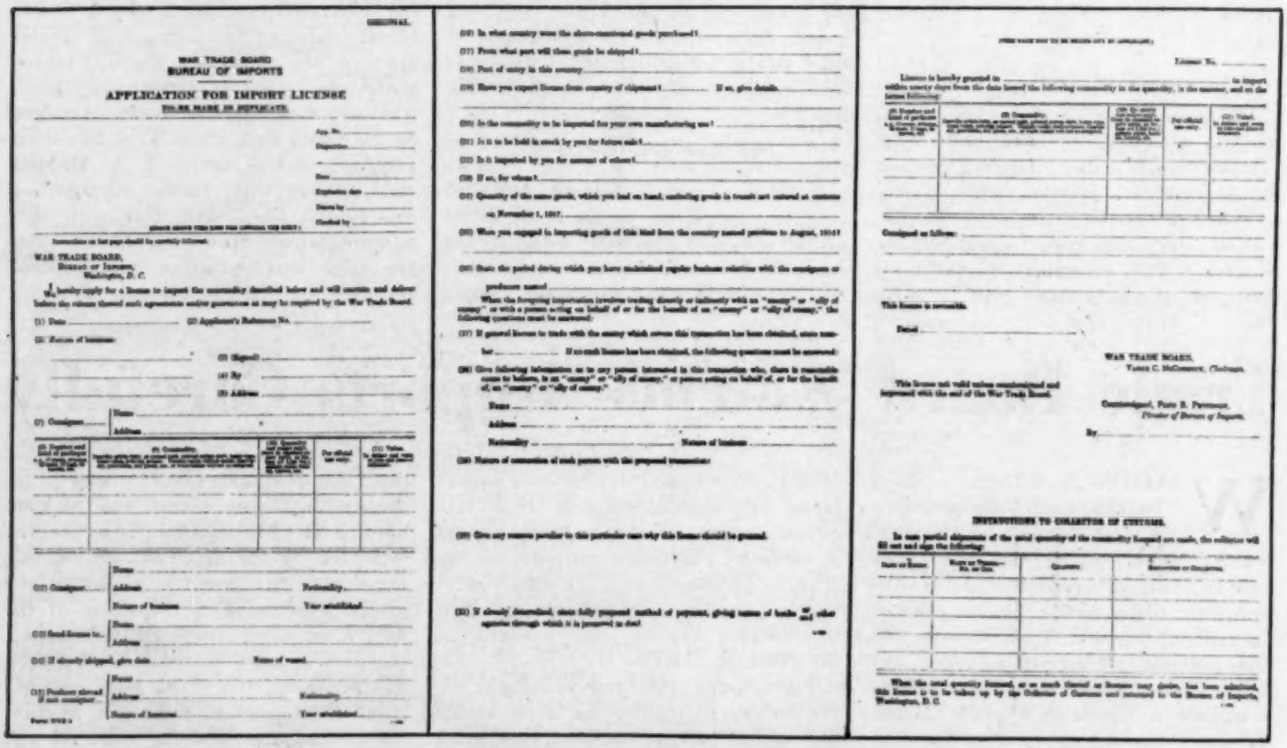
While no extension will be made of 90-day licenses, if the exporter finds the time will expire before delivery to seaboard, he has the privilege of applying for a new license within that time. In special cases license will be granted for longer periods than 90 days and in extreme instances the time limit will be placed at six months. In these cases, too, no extension of time will be allowed. New licenses will have to be sought.

Steel Bids to Navy Stir Up Argument

WASHINGTON, Feb. 12.—Demoralization of the iron and steel industry will follow adoption by the navy department of the policy of buying through competitive bidding, its requirements of steel on which the President has not actually fixed the price originally. This is an argument advanced in support of the war industries board's stand against a competitive test made by the bureau of supplies and accounts.

The war industries board argues, evidently with the expectation of continuing its steel distribution system, that if any other plan is employed by government agencies, mills having received allocated orders through the division of steel supply, will be jammed. Other customers of mills, such as the war department, the shipping board or some firm engaged in war work, would not stand for having production of their own requirements curtailed. This argument of the war industries board is looked upon in some quarters as disregarding its priorities committee. This committee is operating to prevent just what the board fears will happen if the navy's policy becomes general, or is continued by the navy itself. In the event the board insists on maintaining its steel supply division and other branches of the government should adopt the navy's plan, Steel Director Replogle's office would become practically one of statistics where records of the mills would be kept.

The impression is felt in some



WAR TRADE BOARD
BUREAU OF IMPORTS

APPLICATION FOR IMPORT LICENSE

TO BE MADE IN DUPLICATE

FORM FOR IMPORT LICENSE APPLICATION

quarters that certain interests, both in the government and in the steel industry itself, have witnessed the navy's independent action with some degree of satisfaction. In fact there is a belief that the overthrow of the present system would be welcomed by these interests. This belief arises from the general knowledge that certain government departments, and even various iron and steel producers, are not satisfied with the present policy. It is pointed out this is not necessarily due to the management of the system but chiefly to the system itself.

The navy's action is with the avowed purpose of forcing the war industries board to accept the prices recommended on steel products by the industry or to formulate a set of prices on which it will get the President's approval. In that event the navy will accept those prices as final. Under present conditions it feels it can do better in many instances. On an order of 404,000 pounds of rivets in the recent bidding test the accepted total figure was more than $600 under the recommended price.

While the fixed price question is being threshed out by the navy and the war industries board, the federal trade commission is going ahead in compiling data as to steel costs for comparison with that submitted shortly before the first of the year. This is preparatory to whatever action may be taken in the revision scheduled for April 1. Nothing further has been heard from the Pomerene bill although at last reports it is still the intention of its author to have the bill acted upon shortly.

Oil Well Supply Makers to Weigh War Needs

Washington, Feb. 12.—Oil Director Requa of the fuel administration has called a meeting of oil well supply men in Washington March 4. This conference follows an informal one here last week at which it was decided full representation should be given the industry in order to intelligently discuss the needs of the supply companies. Steel makers, particularly pipe manufacturers, will be interested in this conference and it is expected several will attend. In addition to discussing the home needs of the oil producers it is quite probable consideration will be given oil well supply needs in other countries, particularly in Mexico. It is likely representatives of the war trade board's export bureau will attend. Among the points also to be discussed possibly will be some of the requirements as regards tank cars and tank ships. Figures are not available for the number of tank cars now under construction, but it was revealed in the senate shipping board inquiry that 60 tank steamers are being built or are under contract.

More Chrome Needed

Washington, Feb. 12.—Further discovery and exploitation in the abandoned chromite field in the southern part of Lancaster and Chester counties, Pennsylvania, and the northern part of Cecil county, Maryland, is urged by the geological survey. The demand for chrome steel in making high-speed tools, projectile and armor plate affords ample market for the production of any new chrome mines, it is urged, especially in view of the fact domestic production in 1917 aggregated only 40,000 tons and importation of the ore reached only 103,000 tons, for a total supply of 143,000 tons, less than in 1916 by nearly 20,000 tons. Domestic production in 1916 was 47,000 odd tons and by importing 115,945 tons more were available. Domestic ores now are obtained chiefly along the Pacific coast and foreign ores in South Africa and New Caledonia. The survey says many of the old mines in Pennsylvania and Maryland, abandoned in 1882, offer excellent opportunity for increased home production of chrome.

Capital Odds and Ends

Japanese capitalists are reported to be planning the reopening of a number of Mexican mines which have been idle for a long time. Advantageous terms are being offered.

Metal buttons of American manufacture are in heavy demand for export. Button exports in the fiscal year of 1917 increased in value to $1,982,104 from $1,902,556 in 1916 and $654,372 in 1914.

The labor department is planning national registration of women available for work on farms as one of the steps in a campaign to secure sufficient farm labor for the coming season.

The navy is urgently in need of binoculars, spy glasses, telescopes, sextants and chronometers. Owners are requested to send them to the department. An earlier call brought more than 6000 glasses, but more are needed.

On pig iron, the Chicago, Milwaukee & St. Paul railroad asks for an increase to $1.05 per ton in carload rates from Rockford, Rockton, Stillman Valley, Byron, Freeport and Mandota, Ill.; Beloit, Janesville, Watertown, Monroe, Monticello, Madison and Stoughton, Wis., to Chicago and all points taking the same rate.

On carbonic gas in steel tubes, the New York Central railroad asks for a cancellation of the carload rates from Albany, N. Y., to Montreal, Can.

On iron pyrites, chrome ore in bulk and manganese ore, eastern carriers ask for an increase to $4.25 per gross ton in the import rate from New York to Chicago. Authority also is sought to increase import rates to the domestic basis from north Atlantic ports to central freight association territory.

On journal boxes in carloads, an increase from 18.9 cents to 21.5 cents per 100 pounds is asked by the Delaware, Lackawanna & Western railroad on shipments from Lancaster, N. Y., to Hammond, Ind., and Hegeswich, Ill., by way of the Erie railroad to align with rates in competing routes.

On coke from Alabama ovens to Carondolet, Crystal City, St. Louis and other Missouri points and to Collinsville and East St. Louis, Ill., the St. Louis & San Francisco railroad applies for an increase to $3.40 per ton.

The American Institute of Banking's decision to help secure quick attention on drafts attached to bills of lading on food commodities also is expected to help clear the railroad freight congestion.

Settlement of a labor dispute at a plant of the American Locomotive Co. where 5000 employes were out, and of a strike of 60 employes of the Crown Pipe & Foundry Co. at Jackson, O., has been announced by the labor department.

A high power radio station, costing $2,250,000, is being erected in France by the American navy to be used in communicating with the station nearing completion at Annapolis. It will be taken over by France after the war.

Motor truck manufacturing centers in Ohio, Michigan, Illinois, Indiana and Wisconsin are to be connected with two additional main highways to the Atlantic coast to be established by the army transport service. Two such routes, one from Detroit, the other from Buffalo, are already in use.

Amendments by the war trade board to its rules regulating the licenses for bunkering fuel and ship's stores apply to any vessel of American registry not requisitioned by the shipping board as well as to neutrals.

The Merchants & Miners Transportation Co. seeks an increase to 8 cents per 100 pounds on machinery and 5 cents on other traffic in the transfer charge on less-than-carload freight between its pier and other piers at Norfolk.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Financial Sentiment Turning Cheerful

IT used to be the farmer who worried and fretted about the weather, but now the stock broker, the banker and the manufacturer are as keenly interested in the vagaries of the elements as ever a farmer was. The improvement in the weather, not only from a psychological standpoint but from its effect upon the movement of coal and freight helped cheer the spirit of long pessimistic Wall street last week. The workless Monday order unquestionably has helped substantially the railroad situation. It is the railroad situation, and its sister calamity, scarcity of fuel, which have been the outstanding economic phenomena in this country the past few months. There have been other developments contributing to better feeling in financial circles. It is believed the date of the next war loan has been postponed considerably by the adoption of short term government financing by the banks until such borrowings reach $3,000,000,000. But most important of all have been the indications that the government's borrowing for this season will be smaller than the original estimates. Whereas the original budget for the fiscal year 1918 was $21,000,000,000, the estimates later were scaled down to $18,000,000,000 and now it is difficult to see how the sum total for the fiscal year can run as high as $15,000,000,000, in view of recent monthly disbursements. As the government financing has a direct effect upon stock market operations and upon the general business situation as well, these more optimistic inferences are receiving a warm welcome.

May Extend Income Filing

Owing to the delay in distributing individual income tax blanks for incomes in excess of $3000, excess profits and corporation forms, in addition to other forms on which returns must be made, internal revenue officers are convinced that the treasury department will have to extend the time for filing returns beyond Feb. 28, the date originally set for making all final returns. Various collectors have written Commissioner of Internal Revenue Roper suggesting a general extension of time, because of the situation which is developing. However, no ruling as yet is forthcoming. Collectors may in their discretion grant extensions not to exceed 30 days, providing written application is made, but a general extension would eliminate this necessity, although many taxpayers already have applied for such extensions. However, such action would not necessitate a change in the date on which the tax payment is due, June 15. The blanks known as 1040A, covering incomes under $3000, have been sent out in numbers. But there have been distributed few of the blanks known as 1040, covering individual incomes in excess of $3000. Similarly, form 1099, calling for returns from employers and others making payments in 1917 exceeding $800 has been distributed to a very limited degree. In addition, the excess profit and corporation tax blanks are yet to be sent out.

Bethlehem Explains How Surplus Was Acquired

In order to assist its stockholders to establish the amount of their income taxes resulting from dividends paid in recent years, the Bethlehem Steel Corp. has issued a letter explaining these disbursements. Particular reference is made to the 200 per cent stock dividend distributed Feb. 17, 1917. The letter says:

"Some doubt having been raised as to the application of the recent decision of the United States Supreme Court in the case of Towne vs. Eisner to stock dividends declared in 1917, we give the following information: In regard to the stock dividend: The basis of the dividend was a surplus of $30,863,638. The books of the corporation show that its surplus (as distinguished from the consolidated surplus of the corporation and its subsidiaries), on Jan. 1, 1913, was $8,517,953; on Dec. 31, 1913, $12,195,964; on Dec. 31, 1914, $12,814,390, and on Dec. 31, 1915, $12,807,256.

"In determining the surplus at the end of each year, all dividends declared and paid during the year and the dividend that was payable Jan. 2 in the following year were deducted. Of the remainder of the surplus on which the stock dividend was based $56,382 was the amount by which the income received by the corporation in 1916 exceeded expenses and dividends paid or accrued during that year, and $18,000,000 represents an increase on the books of the corporation, as directed by the board of directors, in the value at which the corporation carried the stock of the Bethlehem Steel Co. owned by it.

"The resolution which directed this increase in value on the books of the corporation did not specify when the accumulated earnings or surpluses that undoubtedly were the basis of this increase were accumulated. The books of the Bethlehem company, however, show the following:

Surplus on Dec. 31, 1914, (all added during year end. that date)..	$5,524,203
Added to surplus in 1915, after deducting dividends paid.....	13,102,209
Added to surplus in 1916, after deducting dividends paid.....	35,848,860
Surplus on Dec. 31, 1916.....	$54,475,272

"Of the surplus thus accumulated by the Bethlehem Steel Co., only $2,734,645, which was part of the surplus added in 1914, has been taken upon the books of the Bethlehem Steel Corp. prior to Jan. 23, 1917, in showing the value on such books of the stock of the Bethlehem Steel Co. The resolution adopted by the board of directors in declaring the stock dividend states 'that said dividend as to $8,517,953 is declared out of the accumulated surplus of the corporation on Jan. 1, 1913'."

Midvale's Profits Greater After Excess Provision

Net profits of the Midvale Steel & Ordnance Co. for 1917, before allowing for federal taxes and depreciation, amounted to $71,264,560, or more than double the return in the preceding year, according to the preliminary statement issued last week. The report showed that the management set aside $27,360,270 for the excess profits and war income taxes and then had a balance of $40,650,542, a total $5,630,000 larger than the year before. The reserve for depreciation was $6,415,039, against $3,560,277 in 1916, leaving $34,235,503 available for dividends and the surplus account, an in-

crease of $2,000,000 over 1916 results. The dividend balance was equal to $17.12 for each share of stock, compared with $16.11 the previous year. The Midvale report was particularly interesting in one respect, in which it differed from the other steel companies which have made reports for 1917. This was in its income for the final quarter, which was larger than in any of the preceding quarters. This increase was due partly to the fact that the company reserved a smaller amount for federal taxes than in the previous quarters. The earnings of the year, with deductions, compare as follows:

	1st half	2nd half
Net earnings	$34,825,875	$36,438,687
Federal tax	14,521,618	13,038,652
Interest charges	1,630,977	1,622,771
Depreciation	3,559,097	2,855,942
Net profit	15,314,181	18,921,322

The report states that the figures presented are subject to change in accordance with possible rulings of the treasury department, which may affect excess profits and income taxes.

Hydraulic's Sales Heavy

In the 12 months ended Dec. 31, 1917, the Hydraulic Pressed Steel Co., Cleveland, sold $15,500,000 worth of its products, on which the net earnings amounted to approximately $2,810,000. After reserving $800,000 for estimated income and excess profits taxes, the balance available for interest and dividends, amounted to $2,010,000. Interest and preferred dividends deducted, left a balance which was equivalent to 3½ per cent on the $4,900,000 common stock outstanding as of Dec. 31, which percentage was considerably larger than for the previous year. Unfilled orders on the books at the close of the year totaled approximately $11,000,000.

National Radiator Expands

The Federal Radiator Co., New Castle, Pa., has been purchased by the National Radiator Co., Johnstown, Pa., and Trenton, N. J., and has been merged under the latter title. Branch offices will be maintained in Boston, New York, Philadelphia, Baltimore, Washington, D. C.; Richmond, Va.; Pittsburgh, Cleveland and Cincinnati, with main office at Johnstown. Boilers will be manufactured at the New Castle plant, while hot-water and steam-type cast iron radiators will be produced at Trenton and Johnstown.

This corporation had for its foundation the Fowler Radiator & Mfg. Co., which commenced business in 1894 at Norristown, Pa., in a small leased foundry, with an authorized capital stock of $100,000. In 1902 the name was changed to the National Radiator Co., and in 1911 a plant twice the size of the Johnstown one was built at Trenton, N. J. Officers of the company are: John H. Waters, president; S. B. Waters, vice president and treasurer; G. C. Blackmore, vice president and superintendent of manufacturing; R. E. Warden, general manager of sales; Charles L. Crouse, credit manager, and C. E. Resley, auditor.

Trade Balance Rising

Exceeded only by January's record total of merchandise exports of $613,324,582, which is the largest month in six years, the figures for December, 1917, just announced, are $588,874,958. This brings the year's total to $6,226,255,654, as compared with $5,482,641,101 for 1916. Merchandise imports show a corresponding annual increase. Imports for December, 1917, totaled $227,909,497, compared with $306,622,939 for June, $280,727,164 for May, $270,257,139 for March, and $267,854,767 for August. These last four are the largest months in the 4-year period. The total for 1917 of $2,952,465,955 is the largest in six years. Excess of exports over imports continues to mount. For 1917 it was $3,273,789,699 against $3,091,005,766 in 1916, and $1,776,074,152 in 1915. Since Aug. 1, 1914, $1,637,792,828 worth of explosives and firearms have been exported.

Steel Foundries Doubles Earnings in 1917

Operating earnings of the American Steel Foundries of $4,842,237 for 1916 were almost doubled in 1917, the total, Dec. 31, 1917, being $8,718,296. Reservation of $2,287,600 was made for income and excess profits taxes. The net surplus for 1917, $5,531,839, was equivalent to $32.13 a share on capital stock of $17,184,000, as compared with $19.64 a share in 1916 with a surplus of $3,374,975. The comparative statement of the company for the past three years is as follows:

	1917	1916	1915
Oper. earn.	$8,718,296	$4,842,237	$517,325
Deprec.	917,646	739,414	204,083
Balance	7,800,650	4,102,823	313,242
Oth. income	238,024	122,987	189,523
Total income	8,038,674	4,225,810	502,765
‡Reserve	.....	344,000	250,139
Int. chgs.	219,235	†506,835	†472,200
War taxes	2,287,600	.....	.....
Surplus	5,531,839	3,374,975	*219,574

†Includes sinking fund.
‡For retirement of debentures.
*Deficit.

At an annual meeting of stockholders of the Chicago Railway Equipment Co., Chicago, an increase in the capital stock from $2,500,000 to $3,000,000 was authorized. This increase will be distributed to stockholders.

Reduced Output

Of Coke By-Products Caused by Shortage of Coal

New York, Feb. 9.—Decreased production, due to the shortage of coal, continues to be the dominating factor in the coal tar products market. Contracts previously entered into are taking up so much of the output that stocks available for spot shipment are shrinking. This is particularly true of phenol. Most of the producers some time ago closed contracts for about all they expected to turn out for months ahead. Curtailed operations at by-product plants have made it impossible to make as much phenol as contracts call for. As a result, only a few spot lots are being sold mainly by second hands. These are bringing around 53 to 55 cents per pound. Decreased output also is exerting an influence on the toluol market. Owing to the large requirements of the government as well as the large quantities called for by old contracts closed before the commandeering order of the government no toluol can be spared. Demand upon the government for releases of toluol for commercial purposes is large.

In benzol a good-sized business continues. Producing capacity now is so large that despite the curtailment due to coal shortage, there is enough to take care of contract commitments and to supply spot requirements. Benzol continues at 35 to 40 cents per gallon. Although sales of solvent naphtha are small, this product is strong at 18 to 22 cents per gallon, both for spot and contract. Business in sulphate of ammonia is at a low ebb, due to lack of supplies. Only occasional sales of spot are reported, these going around $5.10 to $5.25 per 100 pounds at tidewater.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant
Pure benzol ..... $0.35 to .40
Toluol (nominal) ..... 1.70 to 1.80
Solvent naphtha ..... .18 to .22

Per Pound at Producers Plant
Phenol ..... $0.53 to .55

Per 100 Pounds at Seaboard
Sulhate of ammonia (nominal) ..... $5.10 to 5.35

Contract

Per Gallon at Producers Plant
Pure benzol ..... $0.35 to .40
Toluol ..... nominal
Solvent naphtha ..... .18 to .22

Per Pound at Producers Plant
Phenol nominal.

Per 100 Pounds at Seaboard
Sulphate of ammonia ..... nominal

Traffic Problems Perplex Trade

Car Shortage and Slow Freight Transit Cause Financial Losses to Dealers—Government Commandeering Complicates Matters—Establishment of Second Ordnance Base Depot Rumored—Ordnance Companies Buy Tools

TRANSPORTATION difficulties as affecting the machine tool industry have become distressing in the east, where the car shortage is interfering with the shipment of tools for essential war work. The slow transit of freight, with the consequent inability of dealers to make prompt deliveries, is resulting in financial loss to the latter. Government commandeering without notification to the original purchaser has been conducive to further complications to dealers and to purchasers. In the Chicago district the tenseness of the traffic situation gradually is subsiding; embargoes are being relieved in some degree, and tracers are endeavoring to straighten out the tangle of freight in railroad yards there. A definite announcement has been made by the fuel administrator permitting the industries to resume work on Mondays. Fuel has been a source of much trouble in New England, and builders in that district, in some cases, are using wood in order to keep their plants operating.

Rumors relative to the establishment of a second ordnance base depot—a duplicate of that now being built in France—persists in the New York market. A Boston interest has issued a list of machines which would be required in the event that another plant of this kind is built. Several companies in the central west which have large ordnance orders have been active in buying equipment of late. So urgent is the need that their inquiries specify either new or used tools, in many cases.

Scattered inquiries prevail in the crane market. Several lists have been issued by shipyards, but these, generally, have been of small size. Shipyards are also active in securing punching and shearing machinery. Builders of coal-handling machinery report that a number of inquiries for this type of equipment are current.

Nation Now Concentrates on Production

TRAFFIC troubles have been the source of considerable difficulty to the machine tool trade. Lack of cars frequently has held up shipments of tools urgently needed for government work. In some cases shipments have been in transit from builders' plants for more than 60 days and still are due to arrive. Instances are noted occasionally where such shipments are found to have been taken and installed by some arsenal or other government plant while the buyer and seller have remained in ignorance until informed by the tracer. Dealers representing manufacturers have found the situation particularly perplexing. Necessarily doing business on a narrow margin of profit, they discount their bills, or in any event avail themselves of very short terms. They buy the machines f.o.b. shipping point, and from the time the machines are boxed until they are delivered, the dealer is compelled to carry the goods on his own capital. This means a substantial shaving down of his profit where the shipments are long delayed. The fuel situation continues troublesome among New England builders. In some cases they are still using wood in lieu of coal and production has been seriously affected in some instances.

Gossip continues to be heard in the trade concerning the construction of a second ordnance base depot to duplicate the base now being built in France. According to these rumors, a decision has not been reached as to whether this base will be built in England or in France. However, a list of machines has been issued by the Stone & Webster Engineering Corp., Boston, government contractor, with a view toward ascertaining how many of the requisite machines are available. From the west the New York market hears reports of further heavy buying by companies having contracts for ordnance and ordnance parts. The Studebaker Corp., South Bend, Ind., which has a contract for recoil cylinders, still has much equipment to purchase. The Standard Steel Car Co., Hammond, Ind., remains in the market. Dodge Bros., Detroit, and the Minneapolis Steel & Machinery Co., Minneapolis, are reported to have filled practically all of their machine tool requirements. An Indiana company, the Wagner Axle Co., which was awarded a contract for artillery wheel hubs, is understood to have closed for about $100,000 worth of machines. The contract for artillery wheels, which originally was arranged to have gone to the Wagner Axle Co., and which is valued at about $5,000,000 to $6,000,000, is not officially reported to have been placed, but is expected to go to the W. F. McCord Co., Chicago. This contract will involve purchases of several hundred thousands dollars' worth of machines.

The lull in the crane market continues, very little new inquiry appearing before dealers and little business being consummated. The General Electric Co. is in the market for three 20-ton, one 7½-ton and one 5-ton electric cranes of special design for its plant at Lynn, Mass. The Pensacola Shipbuilding Co., Pensacola, Fla., is inquiring for a 3-ton electric crane. The government continues to negotiate for three 5-ton and one 15-ton hand-power cranes for the Sandy Hook proving grounds. The Imperial Shipbuilding Co., Detroit, is reported to be inquiring for a second-hand locomotive crane. Demand for punching and shearing equipment may be summed up in two or three sizable inquiries. The latest is from the Cape Fear Shipyards Corp., Wilmington, N. C., which is understood to have taken a government contract for the construction of several tug boats. The requirements of the Groton Iron Works for its shipyard at Alexandria, Va., are yet to be acted upon. The Atlantic Corp., Portsmouth, N. H., which has been the biggest buyer of late, continues in the market for punching and shearing machinery.

Government Buys Heavy Machinery in Pittsburgh

MACHINERY and machine tool equipment purchases being made by the government are heavy, according to sellers in the Pittsburgh district. Domestic business

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Alloy STEELS
in the "Lab."

Agathon laboratory tests are exceedingly severe. Chemically and physically Agathon steels are subjected to every known test to ascertain their fitness for their particular uses,—tests which far exceed those of actual service in intensity and severity.

The comprehensiveness of Agathon laboratory tests affords some suggestion of the thoroughness observed through every stage of the production of Agathon Alloys. Agathon methods represent the ultimate in steel making.

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Massillon, Ohio

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Detroit Office: 326-27-28 Ford Bldg.
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Cleveland Office: Hickox Bldg.
The Hamill-Hickox Co., District Representatives.
Chicago Office: 1370 People's Gas Bldg., 122 So. Michigan Blvd.
C. H. Beach, District Sales Mgr.
Philadelphia Office: 603 Widener Bldg.
Frank Wallace, District Sales Mgr.
Syracuse Office: 601 University Block
T. B. Davies, District Sales Mgr.
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AGATHON STEELS
TRADE MARK

is dull. This is attributed to high prices and slow deliveries occasioned by the filled-up condition of the books of most makers and to the transporation situation. The fact that iron and steel prices are subject to revision on April 1 also has caused commercial buyers to be hesitant about coming into the market. Inquiries and sales of rolling mill equipment have been rather brisk up to recently. The Cleveland Crane & Engineering Co., Cleveland, has sold a 10-ton crane to the Savage Arms Co., Sharon, Pa. The Knox-Andresen Co., Empire building, Pittsburgh, is specializing in tools and production machinery. This company now represents Hannifin Mfg. Co., Chicago, air chucks; Kelly-Reamer Co., Cleveland, production tools; Keller Pneumatic Tool Co., Grand Haven, Mich., riveting hammers; Hoefer Mfg. Co., Freeport, Ill., multiple spindle drill heads; Van Dorn Electric Tool Co., Cleveland, portable electric tools; Bury Compressor Co., Erie, Pa., compressors and vacuum pumps; Economy Baler Co., Ann Arbor, Mich., metal and paper baling presses.

Traffic Situation Improves at Chicago

ALTHOUGH demand for machine tools in the Chicago district seems small compared with the heavy inquiry which prevailed recently, the volume of business is still considerable. Not a single large inquiry is current at present, but many concerns with much equipment are in the market from time to time for single tools to supplement their existing facilities. The Rock Island arsenal recently placed orders for considerable equipment of a general character to supplement larger purchases made previously. Embargoes against shipments have been relieved to some extent and dealers are busy tracing shipments which were caught in the recent blizzard and lost in freight yards. It is understood that the Pettibone-Mulliken Co. and Winslow Bros. of Chicago, have taken contracts from the government and have been supplementing their equipment. It is possible at present to obtain reasonably prompt delivery, three months or less, on medium-sized lathes, all sizes of shapers, hand screw machines, small gear cutters, and small punch presses. Delivery is slow, ranging from four to ten months, on boring mills, horizontal boring machines, millers, planers, grinders, turret lathes, large punch presses and lathes from 24 inches up. The American Tractor Corp. is planning to build a plant at Peoria. The Western Steel Car & Foundry Co. is building a foundry at Hegewisch.

Manufacturers' Planer Needs are Urgent

PLANER needs predominate in the tool lists received in Cleveland during the past week. The Duff Mfg. Co., Pittsburgh, Pa., is in need of the following equipment: One 3-inch bar boring machine; one 2½-inch heavy duty drilling machine; one 5-foot drilling machine; one universal grinder; two milling machines; one 26 x 26-inch x 10-foot planer; one 27 x 27-inch x 8-foot planer; five 30 x 30-inch x 8-foot planers with two heads; one 48 x 48-inch x 10-foot planer; one 48 x 48-inch x 16-foot planer; one 24-inch universal table shaper. Following are the tools included in a list issued by the Locomotive Stoker Co., Pittsburgh, Pa.; one 48 x 48-inch x 10-foot planer with two heads; one slab miller, planer type, 24 x 24 inches x 8 feet or larger; one 5-inch bar boring mill with 48 to 60-inch travel; one 4-inch bar, knee-type horizontal boring mill; one 6-foot radial drill; one drill press with two heads; two 24-inch x 16-foot screw cutting lathes. Quotations on an 84 x 84-inch x 20-foot planer have been asked for by the United Engineering & Foundry Co., for its Youngstown plant. The Murphy Iron Works, Detroit, desires prices on a 42 x 42-inch x 14-foot planer. Prices on a radial drill are desired by the Cleveland Electric Motor Co., Cleveland. The Simplex Mfg. Co., Meadville, Pa., is in need of a 42-inch planer with two heads and one 5-foot motor-driven radial drill. Inquiry has been made by the Ohmer Fare Register Co., Dayton, O., for a 48 x 48-inch x 16-foot planer, with two heads. The W. S. Tyler Mfg. Co., Cleveland, has asked for prices on a 42-inch gear cutter and a crank shaper. A second-hand punching machine with a 24-inch throat is to be purchased by the Insley Mrg. Co., Indianapolis. The Briscoe Motor Corp., Jackson, Mich., is in the market for considerable equipment.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

BOOTHBAY HARBOR, ME.—The Lincoln County Power Co. has taken over the Boothbay Harbor Electric Light & Power Co. and plans to enlarge the plant. Contracts have been awarded for the construction of a new power station.

ANDOVER, MASS.—The plant of the Beaver Chemical Mfg. Co. has been damaged by fire with a loss of $100,000.

BOSTON.—The William Duncan Co. has been incorporated to engage in the foundry business with $75,000 capital by Justin A. Duncan, Andrew W. Duncan and others.

BOSTON.—The Western Coke & Collieries, Inc., has been incorporated to do a coal and metal business with $1,000,000 capital by Webster B. Evans, John F. Oderman and T. M. Tennent, Seattle.

FITCHBURG, MASS.—Fire in the main building of the Fitchburg Foundry Co., Jan. 30, caused $5000 damage.

MAYNARD, MASS. — The Assabet Mills has let the contract for a 5-story, 50 x 400-foot addition.

MIDDLEBORO, MASS.—The Maxim Motor Co. has been incorporated to manufacture automobiles with $100,000 capital, by Carlton W. Maxim, Ernest L. Maxim and F. W. Swett.

NEWTON, MASS.—A spinning mill will be erected this spring by the Sheperd Worsted Co., from plans prepared by Monks & Johnson. It will be four stories high, 80 x 200 feet, of reinforced concrete.

NORTHBORO, MASS.—The main mill and addition of Whittaker & Bacon, manufacturers of wool waste, were damaged by fire Jan. 28, causing a loss of $300,000. Considerable new machinery was damaged. The firm has been working on government contracts.

PAWTUCKET, R. I.—The Steel Specialty Corp. has been incorporated to manufacture steel products with $100,000 capital. Walter A. Briggs, Fred A. Sweet and George E. Thurber are interested.

PROVIDENCE, R. I.—The Paul Stierle Co. has been incorporated to manufacture jewelers' instruments with $10,000 capital. William Forstner, Otto Schierioth and Raymond P. McCanna are incorporators.

BRIDGEPORT, CONN.—J. L. Lucas & Son has been incorporated to engage in the machinery manufacturing business with $25,000 capital. James L. Lucas, Frank B. Lucas

COAL TALKS WITH ROLLING MILL JIM

Don't get the blues, fellows, over this coal shut-down. If you've got Hubbard Rolls in the mill you can roll enough in the five days anyway.

So long,

Rolling Mill Jim.—

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

and Chester L. Lucas, New York, are interested.

BRIDGEPORT, CONN.—A $100,000 plant will be erected by D. Flint, Providence, R. I. The structure will be two stories, 100 x 300 feet.

NEW HAVEN, CONN.—The International Leather & Belt Co., New York, has let the contract for a 1-story, 51 x 144-foot factory building on Middletown avenue, to cost $30,000. It will be the first of three units, the second being the same size as the first and the third a 4-story, 100 x 300-foot structure.

STAMFORD, CONN.—A $12,000 plant will be erected by the American Synthetic Color Co. The building will be two stories high, 50 x 121 feet. Harold A. Parsons, 49 Bank street, has been awarded the general contract.

THAMESVILLE, CONN. — The Eastern Connecticut Power Co., New London, Conn., has completed plans for a $1,000,000 power plant. The building will be of brick, and so constructed that other units can be added as desired. Included in the new equipment to be purchased are two 10,000-kilowatt generators.

Along the Middle Atlantic Seaboard

ALBANY, N. Y.—Contract for the erection of a machine shop, 1-story high, 53 x 125 feet, has been let to the William Key Sheehan Construction Co. by George H. Thatcher, Thatcher and Leonard streets. Cost will be about $9000.

AMSTERDAM, N. Y.—The N. L. Merwin Co. will erect a $9000 factory addition, three stories high, 20 x 130 feet.

BUFFALO.—Bids will be received shortly by Cousins & Son, 74 Wabash street, for 1-story, 80 x 125-foot reinforced concrete boiler manufacturing plant, to cost about $25,000.

BUFFALO.—The Oldman Boiler Works, 38 Illinois street, has awarded the general contract for an addition to its plant.

BROOKLYN, N. Y. — The Interborough Rapid Transit Co., 165 Broadway, New York, has completed plans for a transformer station, one story, 50 x 100 feet.

BROOKLYN, N. Y.—Incorporation papers have been granted to the Star Auto Radiator Works, organized with a nominal capital of $5000. The incorporators are D. and M. Gertel, A. Stutman and others, 450 Georgia avenue.

BROOKLYN, N. Y.—General contract for the erection of a power plant at the navy yard has been awarded to the Marble Architect Co., Broadway and 216th street, New York, by the bureau of yards and docks, Washington. Cost is estimated at approximately $256,000.

ELMIRA, N. Y.—The Horton Avenue Machine Works has been incorporated with $50,000 capital. Incorporators include J. Bocknewch, J. R. and E. Horton and others.

LONG ISLAND CITY, L. I., N. Y.—Plans are being drawn by Louis Allen Abramson, architect, for a 1-story plant, 75 x 180 feet, to be built by the Central Smelting & Refining Co. at Borden avenue and Hayward streets.

MECHANICSVILLE, N. Y. — The West Virginia Pulp & Paper Co. is having plans prepared by F. G. Ten Broeck, architect, 200 Fifth avenue, New York, for a plant addition.

NEW YORK.—The Gilbert Mortimer Co. has been incorporated with a nominal capital of $5000 to manufacture hardware and machinery. The incorporators are J. Warner, B. H. Guterman and G. J. Magnus, 860 East 161 street.

NEW YORK.—The Equitable Machinery Corp. has been chartered with a capital of $25,000. Incorporators include C. and T. F. Hussa and E. C. McManus, 400 West 160 street.

NEW YORK.—The Melrose Tool Corp. has been incorporated, capitalized at $5000. The incorporators are O. R. Lindgren, T. Blank and J. Carlsson, 316 East Fifty-seventh street.

NEW YORK.—The Alloys Mfg. Corp. has been organized with $250,000 capital by M. M. Grunthal, H. C. Wing and C. W. Lucas, 27 Cedar street.

NEW YORK.—Brandon, Hodges & McLean have been organized with $20,000 capital to manufacture metallurgical supplies, and to produce graphite and other industrial carbons. Incorporators include A. C. Head, M. M. Eisenberg, and E. M. James, 2 Rector street.

NEW YORK.—The Controller Co., capitalized at $500,000, has been chartered to manufacture calculating machines. Incorporators include W. E. Miller, F. Vehr and S. N. Taylor, 311 West Ninety-fifth street.

NEW YORK.—A $25,000 warehouse, 1-story high, 50 x 75 feet, will be erected by Edward Caterson, 17 Battery Place. The Beverly S. King & Shiras Campbell Co., 103 Park avenue, will receive bids shortly.

PLATTSBURGH, N. Y.—Construction of a warehouse is contemplated by the A. H. Marshall Co., Inc. Ralph A. Signor, architect, is drawing plans.

ROCHESTER, N. Y. — The High Speed Hammer Co. will receive bids shortly through its architect, Arthur J. Stickney, for the erection of a 1 and 2-story plant addition, 53 x 110 feet.

BIRDSBORO, PA. — The Birdsboro Steel Foundry & Machine Co. is building an extension to its iron and steel foundries, to be L-shaped, consisting of two arms, 70 and 135 feet in length, respectively. New equipment to be installed includes one 35-ton and one 10-ton crane, an additional open-hearth furnace in the steel foundry and an additional 52-inch cupola in the iron foundry. The company has recently undertaken extensive contracts for ship castings, which have made necessary the enlargement of the plant. L. E. Thomas is secretary of the company.

BROWNSVILLE, PA. — The Brownsville Foundry & Machine Works has been incorporated with $10,000 capital. Incorporators include William P. Welker, William W. Welker and Ira E. Stevens.

DUNCANSVILLE, PA.—A company has been formed with $30,000 capital stock to erect a canning factory, manufacturing its own cans. Among the incorporators are A. C. Morrow, J. K. Shoenfielt and Louis McMaster.

MILTON, PA.—The Milton Mfg. Co. has awarded the contract for the construction of a $15,000 machine shop, one story, 50 x 300 feet.

OIL CITY, PA.—The plant of the Oil City Foundry Co. recently was damaged by fire.

PHILADELPHIA. — Work has begun on the construction of a $200,000 round house and a $100,000 machine shop, to be built on American street, by the Philadelphia & Reading railroad. The round house will be of concrete and brick, 1-story high, 109 x 334 feet. The machine shop will be 1-story, 130 x 216 feet, of brick and concrete construction. The William Steele & Sons Co. is in charge of the work.

PHILADELPHIA. — A. L. Carhart has been awarded the contract for the construction of a power house and signal station to be built at Skillman, N. J., by the Philadelphia & Reading railroad. The cost will be about $40,000.

PHILADELPHIA.—Bids will be received soon by John M. Kennedy for the construction of a $15,000 plant addition.

PHILADELPHIA.—The Fulton Truck Co. has been incorporated with $200,000 capital to manufacture automobiles and power boats. The incorporators include F. R. Hansell, and others. The company is incorporated under a Delaware charter.

PHILADELPHIA. — John Dobson, 809 Chestnut street, will take bids shortly, for the erection of a $25,000, 5-story warehouse.

PHILADELPHIA. — A charter has been granted to the Schwerdtle Machine Co., incorporated with a capital of $15,000. Henry G. Schwerdtle is interested.

PITTSBURGH.—The D. L. Wilkoff Steel Co. has been organized with a capital of $50,000. H. T. Feinberg is interested.

READING, PA.—The Linde Air Products Co., Forty-second street building, New York, contemplates the construction of a 1-story plant in this city.

SCRANTON, PA.—A $40,000 factory addition will be erected by the American Color Co. The Taylor & Guryea Lumber Co. has received the general contract.

WILKES-BARRE, PA. — Peter Fry has awarded the general contract for a $40,000 wagon shop, one story, 40 x 80 feet, to Wilson J. Smith.

BOUND BROOK, N. J.—The Calco Chemical Co. is enlarging its plant to provide facilities for filling government contracts.

ELIZABETH, N. J.—The Organic Products & Color Co., Inc., has been chartered with $10,000 capital to manufacture dyestuffs, chemicals, etc. The incorporators are Seymour M. Herman and Hugo Helburn, New York, and Charles B. Rosenberger, Brooklyn, N. Y.

HARRISON, N. J.—The insulated wire and electrical cord departments of the plant of the Driver-Harris Co. were damaged severely by fire Jan. 31. Stanley M. Tracy is in charge.

HARRISON, N. J. — The Standard Wire Co. has been chartered with a capital of $50,000 to manufacture wire cloth and wire goods of all kinds. The company maintains offices at 11 Passaic avenue.

IRVINGTON, N. J.—M. H. Donovan &

—tractor, truck or machine,

Farrell-Cheek

Quality Steel Castings will increase its durability

Made from the finest shock resisting steel, insuring lighter castings of greater strength.

We also manufacture Blank Gears; Carbonizing Boxes and Case Hardening Boxes.

Let us know your requirements.

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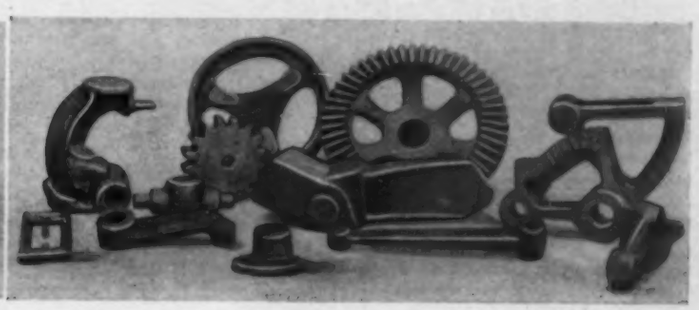
SANDUSKY, OHIO

BRANCH OFFICES

NEW YORK PHILADELPHIA CHICAGO



Say you saw it in THE IRON TRADE REVIEW

Co. has been chartered with $100,000 capital to manufacture skylights. The incorporators are M. H. Donovan, I. E. Donovan and H. H. Habicht, Newark, N. J.

MOUNT HOLLY, N. J.—The government is reported to be planning the erection of a large munitions plant in this city. It is stated that 10,000 acres of the Hanover Farms tract will be taken over for this purpose.

NEWARK, N. J.—The Ballach Smelting & Refining Co. will soon start work on the construction of a $7000 warehouse.

NEWARK, N. J.—The Aluminum Ware & Mfg. Co. has been incorporated with a capital of $1,000,000, by John E. Potter, George F. Bradenburgh and James H. Opp.

NEWARK, N. J.—The Newark Instrument Co. has been chartered with $175,000 capital to manufacture instruments. George W. C. Carter, D. B. Smith and Conover English are incorporators.

NEWARK, N. J.—The Salicylate Products Mfg. Co. has been chartered with $25,000 capital to manufacture chemicals. The incorporators are A. C. Ullman, Charles D. Wagner and William P. Murphy.

NEWARK, N. J.—The Hampered Piston Ring Co. has been chartered with a capital of $1,400,000 to manufacture piston rings. William Schmidt, Christian Schmidt and B. A. Brennan, Baltimore, are the incorporators.

THOROFARE, N. J.—A wagon works to cost $30,000 will be erected by H. A. De Hart. C. W. Willkins will soon take bids.

MAYS LANDING, N. J.—The Bethlehem Steel Co. will start work at once on the construction of a shell loading plant for the government.

PLAINFIELD, N. J.—The Crescent Color & Chemical Works has been chartered with $25,000 capital to manufacture dyes and chemicals. Jerome Alexander, Alexander Alexander, and Walter Alexander, New York, are the incorporators.

PLAINFIELD, N. J.—The Niles-Bement-Pond Co. will start work shortly on the construction of a 60 x 200-foot forge shop. It will be 1-story, of brick, steel and concrete construction.

TRENTON, N. J.—The city commission contemplates the erection of an industrial shop at the School of Industrial Art, North Willow street, to cost $30,000. Address F.

WILMINGTON, DEL.—The Engineering Development Co. of America has been organized with $250,000 capital to manufacture mining machinery. Incorporators are M. L. Hogan, L. A. Irwin and Harry W. Davis.

WILMINGTON, DEL.—The Carneys Point works of the Du Pont Powder Co. has been damaged by fire with a loss of $250,000.

WILMINGTON, DEL.—The Gamble Briquette Process Co. has been incorporated with a capital of $120,000. The incorporators are M. L. Rogers, L. A. Irwin, Harry W. Davis. W. Donnelly, mayor.

BALTIMORE.—The general contract for a $20,000, 2-story mill work plant to be built by Otto Duker & Co., has been awarded to John E. Marshall & Son.

ALEXANDRIA, VA. — The Groton Iron Works, Groton, Conn., plans to build and equip a new shipyard here. The company operates a plant for making steel ships at Groton, Conn., and a yard for wooden ships at Noank, Conn.

BRISTOL, VA.—Erection of a $30,000 power house is contemplated by King college. D. Tilden Scherer is president.

BRISTOL, VA.—The Reynolds Corp. contemplates building a 1-story addition to its chemical plant.

RICHMOND, VA.—The Kingan Co. will erect a $15,000 1-story machine shop addition. W. B. Newell, architect, is taking bids.

WASHINGTON.—The navy department has asked bids for a boiler shop at the Washington navy yard.

Activities in the Central States

APPLETON, WIS.—The date for closing bids for the erection of the new plant of the Reliance Motor Truck Co. has been extended from Feb. 1 to 8. As previously noted, the shop will be 75 x 300 feet, 1-story, and is estimated to cost $25,000 without machinery and equipment. T. M. Purtell, 821 College avenue, is secretary.

BELOIT, WIS. — The Mattison Machine Co., C. W. Mattison, president, has increased its capital from $25,000 to $225,000 and will build additions to its foundry and machine shop.

DE PERE, WIS.—A new pattern shop to cost about $15,000 will be erected at once by the C. A. Lawton Co., manufacturer of gas engines, tractors and farm machinery, to replace the shop which was damaged by fire several weeks ago. The work is in charge of P. T. Benton, architect, Green Bay, Wis.

EAU CLAIRE, WIS. — The Cast Stone Construction Co. has taken the contract for erecting a reinforced concrete and steel truss bridge across the Chippewa river in Chippewa county, at the contract price of $12,000.

GREENBAY, WIS.—The Hartmann-Greiling Co., manufacturer of machinery and boilers, has doubled its machine shop and plans other extensions.

KAUKAUNA, WIS.—The Kaukauna Machine Works has been chartered with $50,000 capital. Incorporators include B. W. Fargo, F. W. Grogan, Joseph J. Jansen and others.

MADISON, WIS.—Articles of incorporation have been filed by the Benson Speed Signal Co., with a capital stock of $100,000. The incorporators are Hal R. Martin, A. D. Campbell and Louis W. Wiedenbeck. The company will manufacture the Benson speed signal device for automobiles and other automobile accessories and supplies.

MILWAUKEE.—The Res Mfg. Co. has awarded to Byrne Bros., 2516 Fond du Lac avenue, contract for the erection of a reinforced concrete and brick shop addition, 55 x 70 feet, to its plant at 2907 Meinecka avenue. The company manufactures hardware specialties. Adam W. Kaufmann is secretary.

MILWAUKEE. — Articles of incorporation have been filed by the Electric Welding & Mfg. Co. The capital stock is $10,000 and the incorporators are George F. Luehring, Oscar Greulich and Joseph Stika.

MILWAUKEE. — The George H. Smith Steel Castings Co. has obtained a permit for the erection of a foundry addition to cost $50,000.

MILWAUKEE.—The Badger Mfg. Corp. has been organized to manufacture automobile parts with $300,000 capital. The incorporators are E. J. Cunningham, Walter H. Schwab and H. W. Schwab.

MILWAUKEE.—Articles of incorporation have been filed by the Ozone Co. of Milwaukee, organized to manufacture machines for the production of ozone. The capital stock is $25,000 and the incorporators are William J. Eberly, Julius E. Kiefer and E. T. Zautcke.

PORTAGE, WIS.—The Chicago, Milwaukee & St. Paul railroad has announced plans for the construction of new machine shops and division headquarters here. Estimated cost is about $50,000. J. A. McDonald, division superintendent, is in charge.

BENTON HARBOR, MICH.—The Metal Specialties Co. has been incorporated with a capital of $87,000.

CADILLAC, MICH. — The Acme Motor Truck Co. has increased its capital stock to $1,000,000 to provide for plant expansion.

DETROIT.—The Russel Wheel & Foundry Co. plans to build a 1-story factory to cost about $75,000. J. Russel is secretary.

DETROIT.—The Swedish Crucible Steel Co., Butler avenue and Grand Trunk railway, has awarded the contract for a 1-story brick and steel foundry addition.

DETROIT. — The Michigan Stamping Co. has awarded a contract for the erection of a 1-story brick and steel pickling shop.

GRAND RAPIDS, MICH.—The Haskelite Co., capitalized at $1,000,000, is planning to purchase $500,000 worth of machinery and equipment for its aircraft wood treating plants at Grand Rapids and Ludington. A new plant is being erected by the J. G. White Engineering Corp., New York.

JACKSON, MICH.—Factory No. 3 of the Perlman Rim Co., Chapin and Horton streets, has been damaged by fire with a loss of $80,000.

BELLEVILLE, ILL. — The Orben Stove Co. has been incorporated with $50,000 capital to operate a foundry. Henry A. Langfelder, Jacob Mueller and George C. Mueller are interested.

CHICAGO.—The Century Rubber Co. has had plans prepared for a 6-story factory to be erected on West Thirty-first street, to cost about $100,000. C. J. Venn, 1346 Rawson street, is in charge.

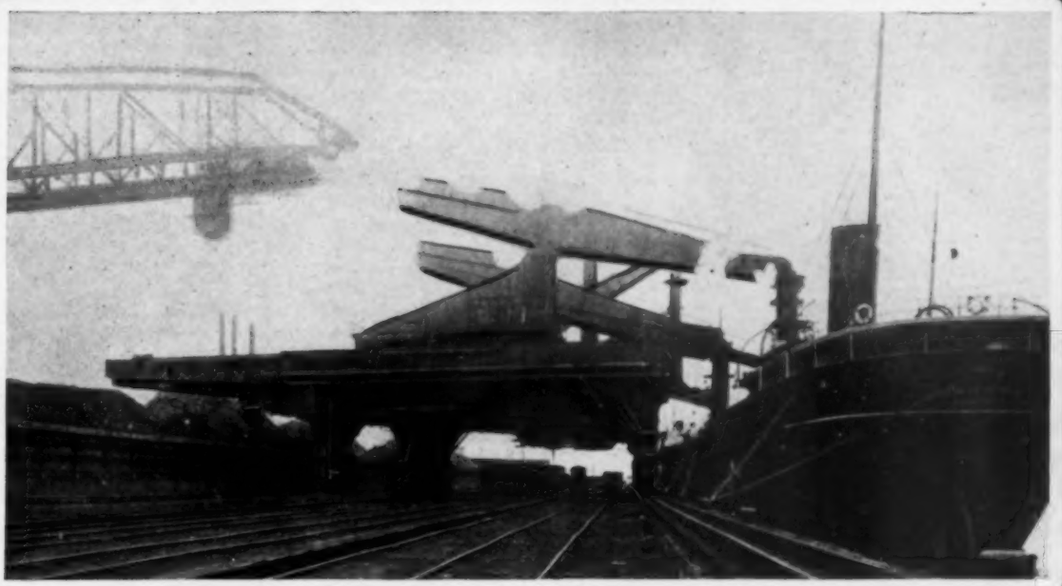
CHICAGO.—A permit has been granted to the Western Steel Car & Foundry Co. for a 1-story steel and frame foundry, to be erected at a cost of $60,000 at 13600 Brandon avenue. Dilliard & Bacon, architects, are preparing the plans.

CHICAGO.—The C. F. Brown Mfg. Co. has been incorporated with $12,000 capital. Incorporators are Vernon Bloom, Claude F. Brown and Thomas M. Campbell.

DECATUR, ILL.—The H. Mueller Mfg. Co. is in the market for machines for the manufacture of fuse parts, including 50 turret lathes.

MACOMB, ILL.—The American Steel Products Co. has increased its capital from $60,000 to $100,000 to provide for increased manufacturing facilities.

MONMOUTH, ILL. — The Monmouth



Steel Giants Do Work of Thousands of Men

All of the large modern ore docks constructed during the last six years have been equipped with **Hulett Boat Unloaders.** These machines have become a standard for unloading Iron Ore, and ***they are equally well adapted for unloading Coal.***

Hulett Unloaders are built in the following sizes and guaranteed capacities: **For Ore:** *17 Ton Buckets,* capacity 1,250,000 tons per season; *15 Ton Buckets,* capacity 1,000,000 tons per season; *10 Ton Buckets,* capacity 750,000 tons per season. **For Coal:** *8 Ton Buckets,* capacity 500,000 tons per season.

Hulett Unloaders require (1) fewest number of men, (2) lowest labor cost per ton, (3) lowest power cost per ton, (4) lowest maintenance cost per ton.

Complete Ore and Coal Handling Stations, equipped with Boat Unloaders, Car Dumpers, Rehandling Bridges, etc., are a specialty of The W-S-M Company.

Bulletins are in preparation on Ore and Coal Handling Machinery. *Send for your copies.*

The four Unloaders pictured above constitute the Pennsylvania Railway's Whisky Island installation at Cleveland, Ohio.

Principal Products of The W-S-M Company

Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, etc.
By-Product Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

Bridge & Mfg. Co. has been incorporated with $20,000 capital by E. J. Jayne, G. M. Jayne and J. H. Jayne.

PEORIA, ILL. — The American Tractor Corp. of which A. E. Rosenthal, 122 South Michigan avenue, Chicago, is in charge, plans a tractor manufacturing plant to include a power house, two foundries, a machine shop and an assembly building to cost jointly about $175,000.

SPRINGFIELD, ILL. — The factory of George Meikle, Eighth and Princeton avenues, has been damaged by fire with a loss to building and machinery of $18,000. The factory was engaged in the manufacture of automobile parts.

EVANSVILLE, IND.—The Hercules Gas Engine Co. plans to build a $50,000 addition to its foundry.

INDIANAPOLIS.—The Cleveland Tractor Co., Cleveland, has awarded an extensive contract to the Weidley Motors Co. for the manufacture of tractor motors. The Weidley company will enlarge its plant.

LOGANSPORT, IND.—The foundry of the Logansport Castings Co. has been damaged with a loss of $75,000. The plant will be rebuilt.

MONTEREY, IND.—The Monterey Electric Light & Power Co. will build a power house 50 x 125 feet in size, to cost $50,000.

MUNCIE, IND.—The Indiana Steel & Wire Co. has increased its capitalization from $150,000 to $450,000 to provide for plant extensions.

AKRON, O.—The Liberty Die Sinking & Drop Forge Co. has been incorporated with $10,000 capital. Edwin R. Hagan, Charles B. Schoonover, J. Walter Harwood Jr., George E. Carle and Merle E. Rudy are interested.

AKRON, O.—The P. H. Kingston Machine Co. has been organized with $20,000 capital. The incorporators include S. S. Wortley, A. A. Schlegel, E. J. Turine, P. H. Kingston and others.

CANTON, O.—The Bumbaugh Foundry & Machine Co. has been incorporated with $20,000 capital. William Potts and William Martin are interested.

CARTHAGE, O.—Plans have been completed for rebuilding the plant of the Hess Spring & Axle Co., 124 West Sixty-ninth street, which was recently damaged by fire. The loss sustained was about $100,000.

CINCINNATI.—The H. Zering Mfg. Co. has been incorporated with $50,000 capital. The incorporators include Walter M. Beinhart, R. J. Wuenker, M. E. Beinhart and others.

CLEVELAND.—E. D. Koetch, architect, 274 East 131 street, will receive bids Feb. 15 for the erection of a factory building to cost $350,000 for the Willard Storage Battery Company.

CLEVELAND. — The Western Machine Products Co., recently incorporated with a capital of $100,000, has leased a plant which it will equip for the manufacture of screw machine products, installing screw machines, boring, milling and drilling machines and forming presses. Total cost of new equipment is estimated at $125,000. L. A. Katz, Williamson building, is president.

CLEVELAND. — The Standard Equipment Co., West 106th street and Lorain avenue, has purchased a site of twelve acres, on which it proposes to build an extension to its plant for the manufacture of automobile parts.

CLEVELAND.—The Northern Boiler Co., 2511 Elm street, has purchased a 5-acre site on Maywood avenue, on which it contemplates erecting a boiler manufacturing plant.

CLEVELAND.—The Woldon Tool Co. has been incorporated with a capital of $25,000. Incorporators include A. R. Sandine and C. A. Bergstrom.

COLUMBUS, O.—The Caldwell Mfg. Co. has been granted a charter with a capital of $15,000. Harold A. Caldwell, Samuel Caldwell, Benton F. Stitt and others are interested.

DAYTON, O.—The Duriron Castings Co., 115 Baird street, plans to erect two 1-story foundry buildings, 50 x 200 feet, to cost $20,000 each. The company specializes in acid resisting castings chiefly for chemical purposes.

LEETONIA, O.—The Aetna Steel Corp., New York, has purchased the plant of the Crescent Machine Co., which it will enlarge and equip for the manufacture of pressed steel products.

WARREN, O.—The plant of the Warren Iron & Steel Co. was severely damaged by fire Jan. 31.

New Business in Eastern Canada

SOUTH VANCOUVER, B. C.—Judge W. H. Bard is interested in a company which will build a rope and twine factory to cost $500,000.

VANCOUVER, B. C.—The Sydney Rubber Roofing Co., Sidney, B. C., will build a factory here to cost $125,000. M. B. D. White is superintendent.

BRACEBRIDGE, ONT.—The W. W. Kinsey Co., Ltd., has been incorporated to manufacture hardware, boats, automobiles and gas engines with $40,000 capital stock. Incorporators are Richard Pawson, Joshua L. Yeoman, Charles E. Lount and others.

BRANTFORD, ONT. — The planing mill owned by the Slingsby Mfg. Co. was damaged by fire with a loss of $35,000. The mill will be rebuilt and new equipment will be required. A. J. Knoepfli is superintendent.

CHATHAM, ONT.—The Pittsburgh & Des Moines Steel Co., Inches avenue, whose plant was recently damaged by fire with a loss of $25,000, will rebuild at once and has let the contract for the erection of building.

ELMIRA, ONT.—A. S. Gingrich is in the market for an oil engine.

FORT WILLIAM, ONT. — The Nyando Pulp & Paper Corp. has been chartered with a capital stock of $1,000,000. William A. Dowler is in charge of the company's affairs.

GEORGETOWN, ONT.—J. B. MacKenzie is in the market for woodworking machinery and equipment.

HAMILTON, ONT.—The Wentworth Orchard Co. is in the market for a 5-horsepower electric motor for use in hydroelectric development.

OSHAWA, ONT.—The Thornton Rubber Co., Ltd., has been incorporated to manufacture automobile and bicycle tires with $50,000 capital stock and will build a plant. Joseph Thornton, Joseph W. Weldon, Spencer L. D. Harris of Montreal, Que., and others are interested.

PORT COLBORNE, ONT. — The town council will build a waterworks pumping plant and requires equipment. A. G. Ross, clerk of the council, is in charge.

RENFREW, ONT.—The British Explosives Ltd., whose plant was recently damaged by fire will rebuild and is in the market for equipment, including electric motors. W. C. Cram is manager.

TORONTO, ONT.—The Turnbull Elevator Co. will erect a 1-story brick factory at 251 Richmond street west, to cost $20,000.

TORONTO, ONT. — Canadian Aeroplanes Ltd., will build two sets of 1-story dry kilns on Dufferin street, at a cost of $9000.

TORONTO, ONT.—The Canada Cycle & Motor Co. has increased its capital stock from $50,000 to $2,000,000 to provide for extensions.

TORONTO, ONT.—E. Pullen, 20 Main street, is in the market for an electric motor.

TORONTO, ONT.—The Monarch Tractors Co., Ltd., has been incorporated to manufacture farm tractors, machinery and implements, with $1,000,000 capital stock, by Edward J. Swift, Almer J. Gannon, E. G. Gore and others.

CAP DE LA MADELEINE, QUE.—The town council will purchase a centrifugal pump for its waterworks plant. J. Bourque is secretary.

LAUZON, QUE. — Joseph Gosselin, St. George street, Levis, Que., has been awarded the contract for the erection of drydock sheds for the Davie Shipbuilding & Repairing Co., to cost $600,000.

LEVIS, QUE.—P. A. Beaulieu, Bienville, Que., will build a foundry here to cost $15,000 and has awarded contract for the building to Joseph Blais, Mont Marie street, Lewis, Que.

MONTREAL, QUE.—The Suburban Water Co., Ltd., has been incorporated to build and operate waterworks plants. John W. Blair, Francis J. Laverty, Westmount, Que.; Charles J. Hale and others are incorporators.

MONTREAL, QUE. — Sussenwein Bros., Ltd., have been incorporated to manufacture iron and steel products and machine tools, with $35,000 capital stock. Peter Bercovitch, Ernest Lafontaine, Nathan Gordon and others are interested.

ST. NARCISSE, QUE.—Price Bros. & Co., 56 St. Peter street, Quebec, will build a pulp and paper plant on the Batiscan river, to cost $30,000.

SYDNEY, N. S.—The Dominion Iron & Steel Co. will commence work shortly on the erection of a coal washing plant to cost $400,000. C. S. Cameron is secretary.

SYDNEY, N. S.—The Atlantic Milling Co., Ltd., Pictou, N. S., will commence immediately on the erection of mills at Sydney. J. F. Smith is president.

WINNIPEG, MAN.—The Manitoba Steel & Iron Co., Ltd., has been incorporated to manufacture steel, iron and copper products, machinery, implements, etc., with $500,000 capital stock, by Thomas R. Deacon, Hugh B. Lyall, Robert D. Guy and others.

New Trade Publications

TOOL GRINDERS.—The Gisholt Machine Co., Madison, Wis., has recently issued a folder describing a belt-driven, semi-automatic, universal tool grinding machine. The machine is said to be especially adapted for grinding tool-post tools, such as used on turret lathes, gear planers and similar machine tools, and the bitts used in tool holders. The folder contains seven illustrations and two tables giving clearance angles for grinding different kinds of tools.

BUCKETS.—The Browning Co., Cleveland, has a new booklet describing its line of grab buckets, clam shells, wood grapples and coke forks. Features of design and the materials of construction are fully described and illustrated. The coke forks and wood grapples are novel adaptions of existing principles in handling machinery. The last few pages of this publication are devoted to descriptions of locomotive cranes, illustrated from photographs.

BUCKETS AND TUBS.—A new catalog issued by the Brown Hoisting Machinery Co., Cleveland, contains full details regarding the line of coal, ore, excavating, drag line and special buckets and tubs manufactured by the company at the present time. Details of construction are explained in a graphic manner and illustrations give an idea of the extensive uses to which this class of machinery is adapted. Grab buckets from 27 to 360 cubic feet capacity are noted in this catalog, and tubs from 13.6 to 292.7 cubic feet are tabulated.

GRAY IRON CASTINGS.—An attractive folder entitled "A Message From Our General Manager" was recently published by the Stroh Casting Co., Detroit. This booklet describes a line of gray iron castings for automobiles and tractors which constitute the chief products of the company. Practically all castings, a number of which are illustrated in the folder, are made on molding machines. The booklet describes the general plan of the work and shows how the Stroh organization has been shaped to realize the largest possible output.

METERS.—An 8-page bulletin describing and illustrating the Thomas type of meter was recently published by the Cutler Hammer Mfg. Co., Milwaukee. The booklet describes the principle of operation of the meter and shows several typical installations. The meter is said to be individual in its construction in that in measuring large quantities of gas it gives the quantities in standard units by which gas is bought and sold and requires no corrections for temperature or pressure. Furthermore it shows the totalized result on an integrating meter and a graphic record of the rate of flow on a curve-drawing meter.

TOOL HOLDERS.—In a catalog issued by the Lovejoy Tool Co., Springfield, Vt., the company's products consisting of turning, facing and planing tools and tool holders are illustrated and described. These cutters are locked in position in the tool holders. The tool thrust is taken up by the locking key, which in turn takes its seat on the solid metal of the holder. A vertical locking wedge secures the cutter in position. The latter may be adjusted when it becomes worn. In the boring bar, the cutter is placed in such a position that it receives largely an end thrust and a natural top rake. The cutter is locked in its holder without the use of set screws.

DRYING OVENS.—The Central Scientific Co., Chicago, has issued a descriptive bulletin describing a new single-walled drying oven which is electrically heated and regulated. This is an addition to the line of constant temperature apparatus previously manufactured by this company. The heating elements of the oven described are located in the base beneath a false bottom, and the make and break is placed on the outside of the oven to secure ease of access and to guard against the explosion of inflammable gases within the oven.

BUILDINGS.—The Trussed Concrete Steel Co., Youngstown, O., has issued a 24-page booklet devoted to standardized structures. The word "standardized" is explained in a foreword. It is pointed out that all the steel shapes necessary for the construction of any building that might be ordered are in the warehouses of the company. All the buyer has to do is to pick out the type of structure he wants. The fabricated shapes can be assembled on the ground in a few days.

OIL FILTERS.—The Burt Mfg. Co., Akron, O., recently issued a catalog illustrating and describing oil filters, exhaust heads and ventilators. The use of oil filters is discussed, with particular reference to economy in lubrication. The catalog contains reproductions of photographs of the company's oiling systems. A short description of ventilation in the factory introduces the section devoted to ventilators. A glass top ventilator manufactured by the company is described in detail. Concluding the catalog is a discussion of exhaust heads giving details of construction and operation. Numerous testimonials as well as views in plants where these devices are in use are to be found throughout the booklet.

HAND STOKERS.—An attractive bulletin devoted to hand stoking systems is being distributed by the Files Engineering Co., Inc., Providence, R. I. This stoker is of the overfeed type, being designed to feed the coal into the furnace in such a manner as to effect the distillation of the volatile matter from the fuel and insure complete combustion. The fire, it is said, may be seen and watched at all times. The fuel is advanced mechanically and all refuse may be deposited in the ash pit as frequently as required. The stoker is designed and constructed for heavy duty. The booklet shows several sectional views and also presents detailed descriptions of small parts.

TUMBLING BARRELS.—Tumbling barrels are illustrated and described in a 20-page bulletin recently published by the Whting Foundry Equipment Co., Harvey, Ill. The barrel heads are heavy cast iron. The trunnions are hollow and made separate from the head. Heads are lined with perforated steel plates on the inside. Ample air space is allowed between heads and liners. Trunnion bearings are cast iron of the self-aligning type, fitted with ring oilers. The exhaust connection box for the separation of grit and heavy particles is fitted to the trunnion at the discharge end of the barrel and is furnished with an automatic dumping device. A portion of the booklet is also given over to Whiting dust arresters and cinder mills.

HEAT TREATING FURNACES.—An 8-page folder has been issued by the Electric Furnace Co., Alliance, O., describing automatic electric furnaces for the heat treatment of high explosive and shrapnel shells. It is pointed out that these furnaces are an adaptation of furnace equipments of similar sizes that have been used for the heat treatment of steel railway equipment and motor car parts for a number of years. It is said that these furnaces combine the accurate temperature control of electric furnaces with uniform quenching through automatic manipulating devices. Manual handling is said to be largely eliminated in treating shells. These furnaces are made in three standard sizes having heating capacities of ½, 1 and 3 tons per hour, respectively.

LATHES.—The Oliver Machinery Co., Grand Rapids, Mich., recently issued an attractive folder devoted to speed lathes. These lathes are for direct or alternating power. The swings are 12 inches diameter over the bed and either 24 or 36 inches between centers, as required. Variations of speed are obtained by means of a 4-step cone of suitable size attached to the armature shaft of the motor, which is located under the housing beneath the bed. The headstock has bearings adjustable to wear. The bed is a cored casting. The top is planed flat to enable the operator's tools to rest on it securely. The inside edges are machined and act as ways for aligning the head and tail stock. The tail stock is of the open side design. It is secured to the bed by a positive lever clamp.

BUCKETS.—The Hayward Co., 50 Church street, New York, recently published its catalog No. 44 in which interesting information on buckets for industrial plants is detailed. Originally the automatic bucket was considered to be only a digging, loading and unloading machine; but this use has been broadened to include a great part of the conveying and rehandling work necessary in foundries, boiler rooms, steel mills and power plants. A wide variety of uses of the electric motor and rope operated buckets is shown by means of photographs, and typical installations are demonstrated by blue prints. The possibility of extending track-ways throughout a plant has greatly widened the field of usefulness of the electric crane and bucket system, and this catalog contains some valuable suggestions along this line.

REINFORCING BARS.—A 24-page bulletin devoted to descriptions and illustrations of concrete reinforcing bars was recently issued by the Cambria Steel Co., Philadelphia. These bars are of substantially uniform cross section in order to provide an equal strength throughout the entire unit. The projections on the bars are arranged in the form of undulations or waves and are so located that the concrete can be firmly bedded on all portions of the bar without possibility of formation of air pockets. It is claimed as a distinct point of superiority that these bars can be spliced satisfactorily which makes the beam dependent on the steel rather than the concrete for its strength. The booklet includes sizes, areas and dimensions of different types of bars and includes specifications such as areas in square inches, weight per foot, etc. Photographs of buildings in the course of erection employing Cambria bars are reproduced in the booklet.

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports.	
Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.35c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.60c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

STEEL WORKS USE
(Gross Tons)

Bundled sheets, Pittsburgh	**$22.00 to 23.00**
Bundled sheets, Cleveland	24.50 to 25.25
Bundled sheets, Buffalo	22.00 to 24.00
City wrought, short, N. Y.	27.50 to 28.00
Frogs, switches, guards, St. L.	30.00 to 31.00
Frogs, switches, guards, Chgo.	30.00
Heavy melting steel, Pitts.	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	**30.00**
Heavy melt'g steel, Cleveland	30.00
Heavy melting steel, Cinci.	**27.00 to 27.50**
Heavy melting steel, east. Pa.	30.00
Heavy melting steel, N. Y.	29.50 to 30.00
Heavy melting steel, St. L.	29.50 to 30.00
Heavy melting steel, Birming.	24.00 to 26.00
Hydraulic press. sheets, Cleve.	28.50 to 29.50
Hydraulic press. sheets, Pitts.	27.00 to 28.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Low phos. steel, Buffalo	40.00
Low phos. steel, Pittsburgh	40.00
Low phos. steel, eastern Pa.	40.00
Shoveling steel, Chicago	**30.00**
Shoveling steel, St. Louis	28.00 to 28.50
Steel rails, short, Chicago	34.00 to 34.50
Steel rails, short, Cleveland	32.00 to 33.00
Steel rails, short, St. Louis	36.50 to 37.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Cincinnati	19.00 to 19.50
Stove plate, St. Louis	20.50 to 21.00
Stove plate, N. J. points	21.50
Stove plate, Birmingham	19.00 to 21.00
Stove plate, Buffalo	25.00
Stove plate, eastern Pa.	23.00 to 24.00
Stove plate, Cleveland	21.00 to 22.00
Stove plate, Pittsburgh	**20.00 to 21.00**
Cast iron borings	11.00 to 12.00

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$22.00 to 23.00
Boiler plate, cut, No. 1, St. L.	22.50 to 23.00
Bundled sheets, Cincinnati	17.00 to 17.50
Knuckles, coup., Chicago	34.00 to 34.50
Knuckles, coup., St. Louis	31.50 to 32.00
Springs, Chicago	37.50 to 38.00
Stove plate, Chicago	22.50 to 23.50

IRON MILL USE
(Gross Tons)

Busheling, No. 1, Cleveland	29.00 to 30.00
Busheling, No. 1, Buffalo	30.00
Busheling, No. 2, Buffalo	22.00 to 24.00
Busheling, No. 1, Pittsburgh	28.00 to 29.00
Cast borings, New York	17.50
Cast borings, eastern Pa.	20.00
Cast borings, Cleveland	20.00
Cast borings, Buffalo	19.00 to 20.00
Cast borings, Pittsburgh	20.00
Cast borings, Birmingham	13.00 to 15.00
Cast borings, Chgo.	19.00 to 19.50
City wrought, long, N. Y.	31.00 to 32.00
Cut forge, Chicago	34.50 to 35.00
Forge flashings, small, Cleve.	26.50 to 27.00
Forge flashings, large, Cleve.	27.50 to 28.00
Forge No. 1, Eastern Pa.	27.50
Grate bars, Buffalo	25.00
Grate bars, Cleveland	21.50 to 22.50
Grate bars, N. J. points	21.50
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	42.00 to 42.50
Iron axles, Cleveland	47.50
Iron axles, eastern Pa.	47.50

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis-St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	79.0 cents
St. Louis	27 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	75 cents
Pacific coast (tin plate)	75 cents

Iron axles, Chicago	47.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00 to 40.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	32.00 to 32.50
Iron rails, St. Louis	34.00 to 35.00
Iron rails, Cleveland	35.00
Machine turnings, Cleve.	20.00
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	17.00
Machine turnings, Pitts.	20.00
Machine turnings, east. Pa.	19.50 to 20.00
Machine turnings, Birming.	17.50 to 19.00
Machine turnings, Chgo.	19.00 to 19.50
Pipes and flues, Cleveland	25.50 to 26.50
R. R. mch. cast, No. 1, Buff.	30.00
R. R. wrgt. No. 1, Buffalo	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
Railroad wrgt., No. 1, Cleve.	35.00
R. R. wrought, No. 1, Pitts.	35.00
Railroad wr'ght, No. 1, Chgo.	35.00
Railroad wr'ght, No. 2, Chgo.	34.50 to 35.00
R. R. wrgt. No. 1, Birming.	29.00 to 33.00
Wrought pipe, Buffalo	29.00
Wrought pipe, eastern Pa.	30.00 to 32.00
Wrought pipe, New York	31.00

(Net Tons)

Angle bars, iron, Chicago	$38.00 to 38.50
Angle bars, steel, St. Louis	31.50 to 32.00
Arch bars & transoms, St. L.	42.00 to 42.50
Arch bars & transoms, Chgo.	39.00 to 40.00
Busheling, No. 1, Chicago	25.50 to 26.50
Busheling, No. 1, Cincinnati	24.00 to 24.50
Busheling, No. 1, St. Louis	26.00 to 26.50
Busheling, No. 2, Chicago	17.50 to 18.50
Cast borings, Cincinnati	13.00 to 13.50
Cast borings, St. Louis	16.00 to 16.50
Iron axles, St. Louis	45.00 to 45.50
Iron axles, Chicago	47.50
Machine turnings, Cinci.	13.00 to 13.50
Machine turnings, St. L.	17.25 to 17.75
Pipes and flues, Chicago	24.00 to 25.00
Pipes and flues, St. Louis	24.50 to 25.00
Railroad wrgt., No. 1, Cinci.	30.00 to 30.50
Railroad wrgt., No. 1, St. L.	31.00 to 31.25
Railroad wrgt., No. 2, St. L.	29.50 to 30.00

IRON OR STEEL WORKS USE
(Gross Tons)

Axle turnings, Cleveland	$24.00 to 25.00
Axle turnings, Buffalo	26.50 to 27.00
Shafting, New York	37.50 to 38.00
Shafting, eastern Pa.	45.00 to 47.50
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	45.50 to 46.00
Steel car axles, Buffalo	45.00 to 47.00
Steel car axles, Cleveland	45.00
Steel car axles, Pittsburgh	**40.00 to 42.00**
Steel car axles, eastern Pa.	47.50
Steel car axles, Chgo.	47.50

(Net Tons)

Shafting, St. Louis	33.50 to 34.00
Steel car axles, St. Louis	43.00 to 43.50

IRON FOUNDRY USE
(Gross Tons)

Car wheels, (iron), Pitts.	$30.00
Car wheels, (steel), Pitts.	**33.00 to 35.00**
Car wheels, eastern Pa.	30.00
Car wheels, Buffalo	30.00
Car wheels, Chicago	30.00
Car wheels, St. Louis	29.50 to 30.00
Car wheels, Birmingham	25.00 to 30.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.00 to 25.00
Cast, No. 1, Birmingham	24.00 to 26.00
Cast, 1, machy. N. J. points	29.50 to 30.00
Cast No. 1, Cleveland	30.00
Cast, 1, heavy, N. J. points	29.50 to 30.00
Cast, 1, machy., N. J. points	30.00
Cast No. 1 Chgo.	30.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable railroad, Cincinnati	24.00 to 24.50
Malleable railroad, Cleveland	30.00
Malleable railroad, Buffalo	30.00
Malleable railroad, Pittsburgh	30.00
Malleable railroad, east. Pa.	30.00
Malleable railroad Chgo.	30.00
Malleable, agricultural, Chgo.	29.50 to 30.00

(Net Tons)

Cast, No. 1, Cincinnati	26.00 to 26.50
Cast, No. 1, St. Louis	24.50 to 25.00
Malleable railroad, St. Louis	26.25 to 26.75
Malleable agricultural, Chgo.	24.00 to 25.00
Malleable agricultural, St. L.	24.50 to 25.00

MISCELLANEOUS USES
(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$35.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00
Reroll. rails, 5 ft. & ov., E. Pa.	35.00
Reroll. rails, 5 ft. & ov., St. L.	34.00 to 35.00
Reroll. rails, 5 ft. or ov., Cleve.	33.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo.	42.50 to 43.50

(Net Tons)

Boiler punchings, Chicago	32.00 to 33.00
Locomotive tires, St. Louis	33.50 to 34.00